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CANADA  
DEPARTMENT OF MINES  
MINES BRANCH

HON. W. TEMPLEMAN, MINISTER; A. P. LOW, LL.D., DEPUTY MINISTER;  
EUGENE HAANEL, PH.D., DIRECTOR.

ANNUAL REPORT

OF THE

(DIVISION OF MINERAL RESOURCES AND STATISTICS)

ON THE

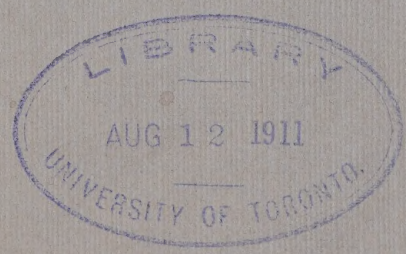
MINERAL PRODUCTION OF CANADA

During the Calendar Year

1909

JOHN McLEISH, B.A.

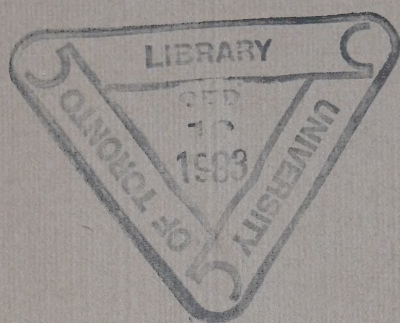
*Chief of the Division of Mineral Resources and Statistics.*



OTTAWA  
GOVERNMENT PRINTING BUREAU  
1911

No. 88







CANADA  
DEPARTMENT OF MINES  
MINES BRANCH

HON. W. TEMPLEMAN, MINISTER; A. P. LOW, LL.D., DEPUTY MINISTER;  
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*Chief of the Division of Mineral Resources and Statistics.*



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Dr. EUGENE HAANEL,  
Director of Mines,  
Department of Mines, Ottawa.

SIR,—I beg to hand you herewith, the Annual Report of the Division of Mineral Resources and Statistics, giving revised statistical information descriptive of the mining and metallurgical production in Canada during the calendar year 1909.

A preliminary report on the mineral production during the year was sent to press, February 24, 1910, and issued within the following week; while special articles on the subjects of iron and steel, coal and coke, structural materials and clay products—included as parts of the present report—have previously been issued as separate bulletins.

Mr. C. T. Cartwright, B.Sc., who was appointed on May 9, 1910, as an assistant mining engineer in the Division, spent about two months in field work, collecting statistics and other information from producers, and has also prepared much of the material for this report.

Free use has been made of the reports published by the Provincial Bureaus of Mines, and grateful acknowledgment is made of the hearty co-operation of mine and smelter operators who have, with few exceptions, cheerfully complied with our requests, and furnished the Department with statistics and information regarding their operations.

I have the honour to be, Sir,  
Your obedient servant,

(Signed) **John McLeish.**

DIVISION OF MINERAL RESOURCES AND STATISTICS,

December 22, 1910.





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## EXPLANATORY NOTES.

The term ton used throughout this report signifies a ton=2,000 pounds; while the year referred to means calendar year, unless otherwise stated. The Government fiscal year formerly ended on the 30th of June; but now terminates on the 31st of March. This change took place in 1907, hence the fiscal period ending March 31, 1907, covers only nine months.

Statistics of exports and imports given throughout this report are compiled from the reports of Trade and Navigation published by the Customs Department.

The term 'production' used throughout this report may in general be interpreted as meaning the quantity sold or shipped. Mineral products mined or manufactured, but not sold or shipped at the end of the year, are not included as 'production.' An exception to this usage will be found in reference to pig iron, in which case the statistics of production represent the quantities made.

The value of the metallic minerals produced, whether refined in Canada or not, is calculated on the basis of the average price of the metal in some recognized market. New York prices have usually been taken as the standard. In the case of lead, however, the New York price is so much higher than that of London, that the the Toronto price—about midway between these two—has been used in 1909. The value of non-metallic products is given as at the mine or point of shipment. This differs from the practice of the Ontario and Quebec Bureau of Mines. The value adopted by these Bureaus for metallic products is the value of these products at the point of production, as given by the producers. In the case of nickel, the value given by the Ontario Bureau of Mines, in 1909, is equivalent to 29.5 per cent of the final value of the metal. The value given to copper is 54.7 per cent of the final value; while the value given to the silver is 93.4 per cent of the final value. In British Columbia, the custom of the Provincial Bureau of Mines is to value the lead at 90 per cent, the silver at 95 per cent, and the copper at 100 per cent of the average prices for the year in the New York metal market. The Provincial Bureau of Mines of Nova Scotia does not place a value upon the production.

The calculation of the quantities of metal production exhibits an equal lack of uniformity of method. In some cases the full assay content of the ore is given as production, while in other cases smelter losses are deducted. There is, moreover, the distinction between ore raised and ore shipped.

It will be seen, therefore, that in comparing the statistics of mineral production published by different authorities it is very important to take into account the basis on which the figures are compiled, whether relating to quantity or value, and to know whether or not, and to what extent, the statistics include the production of matte or metals from imported ores. The Province of Nova

Scotia has a large iron and steel industry, based almost entirely on imported iron ores; Quebec has an industry in the manufacture of aluminium, based almost altogether on imported ores; while the iron smelting industry of Ontario is to a considerable extent based on both imported ores and fuels.

In the compilation of the statistics for these reports, it will be the practice, henceforth, to show as closely as may be ascertained the metal production based on smelter recovery.

# THE MINERAL PRODUCTION OF CANADA

During the Calendar Year

1909.

## INTRODUCTION.

Tabulated statements of the mineral production of Canada in 1908 and 1909 will be found on pages following.

The revised statistics show the total value of the production in 1909 to be \$91,831,441, as compared with a value of \$85,557,101 in 1908; indicating an increase in 1909 of \$6,274,340 or 7.3 per cent. The figures, however, do not quite show the relative growth of the mineral production, owing to the change in method of compiling or stating metal production adopted in 1909. The statistics of metal production in 1908 were in part based on the full metal content of ores shipped, without making allowance for smelter losses, while those for 1909 are based, as far as possible, altogether on smelter recoveries. Notwithstanding this restriction, the metal production in 1909 shows an increase of \$2,382,474 over that of 1908. In the structural materials and clay products an increase is shown of \$5,193,394, while in the other non-metallic products there was a decrease of \$1,001,533.

The growth of the annual mineral production since 1886, the first year for which complete statistics for the whole of Canada are available, is shown herewith. During the first ten years, between 1886 and 1895, the production a little more than doubled, while during the next ten year period the production was increased more than three-fold. During the last four years the increase has been about 32 per cent.

### Annual Mineral Production in Canada since 1886.

Year.	Value of Production.	Value per Capita.	Year.	Value of Production.	Value per Capita.
	\$	\$ cts.		\$	\$ cts.
1886.....	10,221,255	2 23	1898.....	38,412,431	7 32
1887.....	10,321,331	2 23	1899.....	49,234,005	9 27
1888.....	12,518,894	2 67	1900.....	64,420,877	12 04
1889.....	14,013,113	2 96	1901.....	65,797,911	12 25
1890.....	16,763,353	3 50	1902.....	63,231,836	11 55
1891.....	18,976,616	3 92	1903.....	61,740,513	11 03
1892.....	16,623,415	3 39	1904.....	60,082,771	10 36
1893.....	20,035,082	4 04	1905.....	69,078,999	11 35
1894.....	19,931,158	3 98	1906.....	79,286,697	12 55
1895.....	20,505,917	4 05	1907.....	86,865,202	13 35
1896.....	22,474,256	4 38	1908.....	85,557,101	12 32
1897.....	28,485,023	5 49	1909.....	91,831,441	12 82



## The Mineral Production of Canada in 1908.

Product.		1908.		Per cent of total.
		Quantity.	Value. (d)	
METALLIC.			\$	%
Antimony, ore.....	Tons.*	148a	5,443a	
Antimony, refined.....	Lbs.			
Cobalt (c).....	"		113,423	0.13
Copper.....	"	63,702,373	8,413,876	9.83
Gold.....	Ozs.	476,112	9,842,105	11.50
Pig iron from Canadian ore (b).....	Tons.	99,420	1,664,302	1.95
Iron ore (a).....	"			
Lead.....	Lbs.	43,195,733	1,814,221	2.12
Nickel.....	"	19,143,111	8,231,538	9.62
Silver.....	Ozs.	22,106,233	11,686,239	13.66
Zinc ore.....	Tons.	452	3,215	
Total value of metallic.....			41,774,362	48.83
NON-METALLIC.				
Arsenic.....	Tons.		58,566	
Asbestos.....	"	66,548	2,555,361	2.93
Asbestic.....	"	24,225	17,974	
Calcium carbide.....	"	6,864	417,150	0.49
Chromite.....	"	7,225	82,008	
Coal.....	"	10,886,311	25,194,573	29.45
Corundum.....	"	1,089	100,398	0.12
Feldspar.....	"	7,877	21,099	
Graphite.....	"	251	5,565	
Graphite, artificial.....	"	214		
Grindstones.....	"	3,843	48,128	
Gypsum.....	"	340,964	575,701	0.67
Limestone used as flux.....	"	418,661	289,705	0.34
Magnesite.....	"	120	840	
Mica.....	"	436	139,871	0.16
Mineral pigments:—				
Barytes.....	"	4,312	19,021	
Ochres.....	"	4,746	30,440	
Mineral water.....			151,953	0.18
Natural gas.....			1,012,660	1.18
Peat.....	Tons.	60	180	
Petroleum.....	Bls.	527,987	747,102	0.87
Phosphate.....	Tons.	1,596	14,794	
Pyrites.....	"	47,336	224,824	0.26
Quartz.....	"	44,741	52,830	
Salt.....	"	79,975	378,798	0.44
Talc.....	"	1,016	3,048	
Tripolite.....	"	30	195	
Total.....			32,142,784	37.57

\* Short tons throughout. (a) Exports. (b) Only the quantity and value of pig iron attributed to Canadian ore are here given. The total production of pig iron in Canadian furnaces in 1907 was 651,962 tons, valued at \$9,125,226, and in 1908, 630,835 tons, valued at \$8,111,194. (c) Value received by shippers of silver-cobalt ores for cobalt content. (d) The metals copper, lead, nickel, and silver are valued at the final average value of those metals in the New York metal market, namely, for 1907: copper 20.004 cents, lead 5.325 cents, nickel 45 cents per pound; silver 65.327 cents per ounce. For 1908 the average values were: copper 13.208 cents, lead 4.200 cents, nickel 43 cents per pound; and silver 52.864 cents per ounce. The other metallic, and the non-metallic products are valued at their shipping values.

The Mineral Production of Canada in 1908—*Concluded.*

Product.	1908.		Per cent of total.	
	Quantity.	Value.		
<i>Structural Material and Clay Products.</i>			\$	%
Cement, natural. ....	Bls.	1,044	815	.....
Cement, Portland.....	"	2,665,289	3,709,139	4·34
Clay products :—				
Bricks, common.....	No.	353,261,268	2,611,554	3·05
" pressed.....	"	53,480,764	517,180	0·60
" paving.....	"	3,719,961	59,456	.....
" moulded and ornamental .....	"	.....	18,535	.....
Fireclay, and fireclay products.....			110,302	0·13
Fireproofing and architectural terra-cotta, etc. ....			170,211	0·20
Pottery.....			200,541	0·23
Sewer-pipe .....			514,362	0·60
Tiles, drain.....			298,561	0·35
Lime.....	Bus.	3,601,468	712,947	0·83
Sand-lime brick.....	No.	17,288,260	152,856	0·18
Sand and gravels (a).....	Tons.	298,954	161,387	0·19
Slate .....	Squares.	2,950	13,496	.....
Stone :—				
Building stone.....			1,800,000	2·10
Flagstones.....	Sq. yds.	6,800	6,293	.....
Granite.....	Tons.		282,320	0·33
Total Structural Material and Clay Products..			11,339,955	13·25
Estimated for mineral products not reported .....			300,000	0·35
Grand Total. ....			85,557,101	100·00



## The Mineral Production of Canada in 1909.

Product.	1909.		Pe cent of total.
	Quantity.	Value (b).	
METALLIC.			
		\$	%
Antimony, ore.....Tons.*	35	1,575	....
Antimony, refined.....Lbs.	61,207	4,285	....
Cobalt (k)....."	"	94,609	0.10
Copper (c)....."	52,493,863	6,814,754	7.42
Gold.....Ozs.	453,865	9,382,230	10.22
Pig iron from Canadian ore (d).....Tons.	149,444	2,222,215	2.42
Iron ore (a)....."	21,956	61,954	....
Lead (e).....Lbs.	45,857,424	1,692,139	1.84
Nickel (f)....."	26,282,991	9,461,877	10.30
Silver (g).....Ozs.	27,529,473	14,178,504	15.44
Zinc ore.....Tons.	18,371	242,699	0.26
Total value of metallic.....		44,156,841	48.08
NON-METALLIC.			
Arsenic.....Tons.		67,446	....
Asbestos....."	63,349	2,284,587	2.49
Asbestic....."	23,951	17,188	....
Chromite....."	2,470	26,604	....
Coal....."	10,501,475	24,781,236	26.99
Corundum....."	1,491	162,492	0.18
Feldspar....."	12,783	40,383	....
Graphite....."	864	47,800	....
Graphite, artificial....."	257	.....	....
Grindstones....."	4,275	54,664	....
Gypsum....."	473,129	809,632	0.88
Magnesite....."	330	2,508	....
Mica....."	369	147,782	0.16
Mineral pigments:—			
Barytes....."	179	1,120	....
Ochres....."	3,940	28,093	....
Mineral water....."		175,173	0.19
Natural gas (h)....."		1,207,029	1.31
Peat.....Tons.	60	240	....
Petroleum (i).....Bls.	420,755	559,604	0.61
Phosphate.....Tons.	998	8,051	....
Pyrites....."	64,644	222,812	0.24
Quartz....."	56,924	71,285	....
Salt....."	84,037	415,219	0.45
Talc....."	4,350	10,300	....
Total.....		31,141,251	33.91

\*Short tons throughout.

(a) Exports.

(b) The metals, copper, lead, nickel, and silver are for statistical and comparative purposes valued at the final average value of the refined metal. Pig iron is valued at the furnace, and non-metallic products at the mine or point of shipment.

(c) Copper content of smelter products and estimated recoveries from ores exported, at 12.982 cents per pound.

(d) The total production of pig iron in Canada in 1909 was 757,162 tons valued at \$9,581,864, of which it is estimated 607,718 tons valued at \$7,359,649 should be credited to imported ores.

(e) Refined lead and lead contained in base bullion exported at 3.690 cents per pound, the average price for the year in Toronto.

(f) Nickel content of matte produced at 36 cents per pound (the average minimum quotation for nickel in New York less 10 per cent). The value of the nickel contained in matte was, as returned by the operators, \$2,810,748 or an average per pound of 10.7 cents.

(g) Estimated recoverable silver at 51.503 cents per ounce.

(h) Gross returns for sale of gas.

(i) Quantity on which bounty was paid and valued at \$1.33 per barrel.

(k) Value received by shippers of silver cobalt ores for cobalt content.

The Mineral Production of Canada in 1909—*Concluded.*

Product.	1909.		Per cent of total.	
	Quantity.	Value.		
<i>Structural Material and Clay Products.</i>		\$	%	
Cement, Portland.....	Bls.	4,067,709	5,345,802	5·82
Clay products:—				
Bricks, common.....	No.	539,228,708	4,212,424	4·59
" pressed.....	"	57,264,656	630,677	0·69
" paving.....	"	3,759,803	67,408	.....
" moulded and ornamental.....	"	.....	8,866	.....
Fireclay, and fireclay products.....	.....	.....	78,132	.....
Fireproofing and architectural terra-cotta, etc.....	.....	.....	113,886	0·12
Pottery.....	.....	.....	285,285	0·31
Sewer pipe.....	.....	.....	645,722	0·70
Tiles, drain.....	.....	27,571,097	408,440	0·44
Lime.....	Bus.	5,592,924	1,132,756	1·23
Sand-lime brick.....	No.	27,052,864	201,650	0·22
Sand and gravels (a).....	Tons.	481,584	256,166	0·28
Slate.....	Squares.	4,000	19,000	.....
Stone:—				
Granite.....	.....	.....	454,824	0·50
Limestone.....	.....	.....	2,139,691	2·33
Marble.....	.....	.....	158,441	0·17
Sandstone.....	.....	.....	374,179	0·41
Total structural and clays.....		.....	16,533,349	18·01
Grand total.....		.....	91,831,441	100·00

Metalliferous products are credited with about 48 per cent of the total production in 1909. The total quantity of ore smelted in Canadian furnaces was larger than during the previous year, and there was an increased production of nearly all the metals, the principal exception being copper.

The prices of the metals remained fairly constant throughout the year, and the averages differed but slightly from those of 1908.

A comparison of New York average monthly prices is shown herewith.

## Average Monthly Prices of Metals, 1906-9.

—	1906.	1907.	1908.	1909.
	Cts.	Cts.	Cts.	Cts.
Copper.....	19·278	20·004	13·298	12·982
Lead.....	5·657	5·325	4·200	4·273
Nickel.....	41·64	45·000	43·000	40·000
Silver.....	66·791	65·327	52·864	51·503
Spelter.....	6·198	5·962	4·720	5·503
Tin.....	39·819	38·166	29·465	29·725

The metal mining industries of Ontario were particularly active during 1909, there being a very important increase in the production of nickel and copper at Sudbury, and in the silver production from Cobalt. The iron mining and smelting industries of eastern Canada also made good progress during the year, showing the largest production on record. In the west, in British Columbia there was a falling off in ore shipments, owing to the closing down of a number of important mines with a resulting falling off in production of gold, silver, and copper; the placer gold recovery in this Province was also considerably less than in 1908. On the other hand, there was an increased production of lead and an important production of zinc ore in 1909. The Yukon gold production was again increased.

In the non-metallic class of products there was a falling off in the shipments of asbestos, chromite, coal, and petroleum, and substantial increases in the production of feldspar, gypsum, natural gas, pyrites, salt, and talc. Exclusive of the structural materials and clay products, the net result was a falling off in production of over 3 per cent. The production of cement, clay products, stone lime, etc., was greatly increased in 1909, the aggregate of this class showing an advance of over 45 per cent.

### EXPORTS AND IMPORTS.

A very large portion of the mineral production of Canada is exported for refining and manufacturing in the United States and other countries, while considerable quantities of manufactured mine products are imported for Canadian consumption.

The following tables of exports and imports have been compiled from the Trade and Navigation Reports of the Customs Department. The exports of the various products of the mine during the calendar years 1908 and 1909 are shown in the first table, the total value being a little under \$40,000,000 in 1908, and nearly \$43,000,000 in 1909.

The second table shows the exports during the fiscal years classified according to destinations. It will be seen that during the fiscal years 1908-9, the United States took 90 per cent of the whole and Great Britain about 9 per cent, the balance being distributed among about 22 other countries.



## Exports of the Products of the Mine—Calendar Years 1908 and 1909.

	1908		1909	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Arsenic..... Lbs.	1,913,732	43,493	3,111,249	119,673
Asbestos..... Tons	61,210	1,842,763	56,971	1,729,857
Barytes..... Cwt.	3,509	13,690		
Chromite..... Tons	4,571	56,864	1,794	20,858
Coal..... "	1,729,833	4,661,377	1,588,099	4,456,342
Feldspar..... "	9,524	34,045	10,834	35,234
Gold..... "		7,740,918		5,629,549
Gypsum..... Tons	280,091	324,574	315,201	372,286
Copper, fine, in ore, etc. Lbs.	51,136,371	5,934,559	54,447,750	5,832,246
Lead, in ore, etc. "	4,511,931	153,394	6,226,068	132,578
" in pig. "	13,942,663	469,060	11,301,960	361,064
Nickel, in ore, etc. "	19,419,893	1,866,624	25,616,398	2,676,483
Platinum in ore, concentrates. Ozs.	43	937	466	2,118
Silver in ore, etc. "	20,884,451	12,403,482	31,126,504	15,719,909
Mica..... Lbs.	580,195	198,839	717,066	256,834
Mineral pigments..... "	249,635	4,850	1,316,514	7,956
Mineral water..... Gals.	8,953	3,659	60,562	7,433
Oil, refined..... "	296	71	7,768	934
Ores—				
Antimony..... Tons	148	5,443	4	120
Iron..... "	4,334	72,260	21,956	61,954
Manganese..... "			3	434
Other ores..... "	13,910	509,779	11,939	625,142
Phosphate..... "	1	30	895	15,735
Plumbago..... Cwt.	7,706	10,158	20,070	52,438
Pyrites..... Tons	17,283	96,600	35,798	156,644
Salt..... Lbs.	529,229	3,840	276,765	2,488
Sand and gravel..... Tons	298,954	161,387	481,584	256,166
Slate..... "	10,709	2,539	134	612
Stone, ornamental..... "	1,314	28,777	1,027	8,606
" building..... "	4,009	14,034	26,672	15,481
" for mfg. of grindstones..... "	661	5,991	125	1,685
Other products of the mine.....		176,007		109,350
Manufactures—				
Bricks..... M.	2,344	9,047	365	2,255
Aluminium in bars, etc. Lbs.	1,713,800	399,785	6,134,500	918,195
" manufactured.....		1,727		3,453
Cement.....		34,591		113,362
Clay, manufactures of.....		92		979
Coke..... Tons	58,708	248,759	74,067	329,051
Grindstones manufactured.....		13,730		13,942
Gypsum, ground.....		9,765		2,787
Iron and steel—				
Stoves..... No.	651	8,258	744	10,330
Castings, N.E.S.....		28,062		25,038
Pig iron..... Tons	290	10,614	5,063	186,778
Machinery (Linotype).....		126,590		43,686
" N.E.S.....		285,257		421,707
Sewing machines..... No.	9,697	109,002	12,759	147,402
Typewriters..... "	3,720	169,939	3,749	238,167
Hardware, tools, etc.....		57,631		52,207
" N.E.S.....		59,304		35,507
Scrap iron and steel..... Cwt.	92,566	73,807	410,506	305,256
Steel and manufactures of.....		1,169,674		1,132,678
Lime.....		43,316		48,821
Metals, N.O.P.....		65,360		134,062
Plumbago, manufactures of.....		876		864
Stone, ornamental.....		13,748		33,097
" building.....		1,446		501
		39,780,424		42,868,334

**Exports showing Destination of Mine Products during the Fiscal Years  
1907-8 and 1908-9.**

Destination.	1907-8 Value.	1908-9 Value.	Destination.	1907-8 Value.	1908-9 Value.
	\$	\$		\$	\$
United States.....	35,219,840	31,260,862	British Possessions (all other).....	25	4,779
Great Britain.....	1,560,842	2,986,967	Bolivia.....		4,016
Hong Kong.....	183,017	602,347	Italy.....	22,055	2,773
China.....	419,576	595,683	Argentina.....	8,445	1,735
Newfoundland.....	421,995	501,559	British Africa.....	28,039	310
Germany.....	33,748	337,316	British Guiana.....		77
Belgium.....	627,506	209,640	Austria-Hungary.....	1,500	
Japan.....	207,872	180,679	Holland.....	5,253	
Australia.....	58,560	179,276	Spain.....	393	
Mexico.....	70,941	170,797	Cape Verde islands.....	12,792	
France.....	60,886	67,921	Philippines.....	7,550	
Bermuda.....	72,686	41,426	Egypt.....	6,717	
West Indies.....	28,857	31,838	Russia.....	3,985	
St. Pierre.....	28,321	27,508	Chili.....	1,250	
New Zealand.....	22,793	19,441	Switzerland.....	385	
Peru.....		12,328			
Cuba.....	61,304	11,428			
Dutch East Indies.....		6,993	Total.....	39,177,133	37,257,699

**IMPORTS.**

**Minerals and Mineral Products, Fiscal Year 1908-9.**

Products.	Value.	Products.	Value.
	\$		\$
Alumina.....	99,491	Litharge.....	43,597
Alum.....	30,630	Lithographic stone.....	8,813
Aluminium.....	197,123	Manganese, oxide of.....	6,561
Antimony.....	28,482	Magnesia.....	9,684
" salts.....	3,651	Marble and mfs. of.....	200,928
Arsenic.....	14,575	Mercury.....	46,217
Asbestos.....	180,598	Metallic alloys—	
Asphaltum.....	337,289	Babbet metal.....	46,581
Bells and gongs.....	90,706	Brass and mfs. of.....	1,507,711
Bismuth.....	1,133	Britannia metal.....	47,887
Blanc fixe and satin white.....	12,125	German silver, nickel and nickel silver.....	99,333
Blast furnace slag.....	48,773	Type metal.....	8,459
Borax.....	87,383	Mineral and bituminous substances.....	52,052
Bricks and tiles.....	464,576	Mineral and metallic pigments.....	941,797
" fire.....	350,457	Mineral water including aerated water.....	159,221
Burrstones.....	1,141	Nickel anodes.....	14,930
Cement.....	481,875	Ores of metals, N. O. P.....	2,606,042
Chalk, etc.....	105,741	Paraffine wax.....	12,795
Clays.....	190,235	" candles.....	14,806
Coal.....	27,185,469	Petroleum and products of.....	3,058,387
Coal tar and coal pitch.....	198,083	Phosphate (fertilizer).....	36,465
Coke.....	1,136,624	Platinum and mfs. of.....	47,371
Copper and mfs. of.....	2,469,646	Precious stones.....	1,371,971
Cryolite.....	7,610	Pumice.....	8,192
Crucibles, clay or plumbago.....	37,213	Salt.....	460,321
Chloride of lime.....	67,783	Saltpetre.....	96,718
Earthenware.....	1,716,887	Sand and gravels.....	136,011
Electric carbons.....	100,312	Slate and mfs. of.....	124,065
Emery.....	73,631	Stone and mfs. of.....	422,925
Flint, quartz, etc.....	60,528	Sulphate of copper.....	93,087
Fullers earth.....	5,058	" iron.....	6,579
Fossils.....	543	Sulphur and phosphorus.....	429,653
Gold and silver, mfs. of.....	1,559,577	Sulphuric acid.....	3,298
Graphite and mfs. of.....	39,335	Tin and mfs. of.....	2,988,120
Gypsum and plaster of Paris.....	105,882	Tufa, calcareous.....	206
Iron and steel—		Whiting.....	45,314
Pig iron.....	873,932	Zinc and mfs. of.....	470,944
Ferro-silicon etc.....	388,024		
All other iron and steel.....	31,821,441	Total.....	86,725,592
Kainite.....	7,993		
Lead and mfs. of.....	410,433		
Lime.....	106,263		

It will be observed also in the first table, that the metals and the metal products constitute over 80 per cent, and coal alone, over 11 per cent of the total exports.

Attention has frequently been drawn to the fact that not only is a very large portion of Canada's mineral production exported, but that on the other hand refined or semi-manufactured products of a similar class are re-imported for domestic consumption, and this condition is true not only of our metallic products, but also, to a very large extent, of non-metallic products.

The lead smelter and refinery at Trail has, of course, provided a market for Western Canadian lead ores, and furnished a source of supply of pig lead for domestic consumption.

Our copper production is altogether, and our gold and silver very largely, exported; while in the import table it is shown that we import copper and brass to a value of about \$4,000,000, manufactures of gold and silver, \$1,559,577, and zinc, 470,944.

Amongst the non-metallic class, the production of asbestos, graphite, gypsum, mica, corundum, feldspar, etc., is largely exported either for refining or for consumption abroad.

Statistics of imports of minerals and mineral products during the fiscal years 1908-9 are shown in the next table. The total value of the imports during the year was \$86,725,592, a considerable falling off from the previous year, when the imports were \$124,388,109. Of the imports in 1909, a little over 40 per cent was made up of iron and steel products; 15 per cent of other non-metallic products, and about 33 per cent of coal and coke.

## PRODUCTION BY PROVINCES.

A summary of the mineral production by provinces in 1908 and 1909 is shown in the accompanying tables, in the first of which the total production in the several provinces, and the percentage of each, is given for the past three years. It will be observed that the largest production during each of the last three years has been from the Province of Ontario, British Columbia occupying second place. These two Provinces together contributed about 65 per cent of the total in 1909.

The last table shows the total mineral production by provinces for the years 1899 to 1909 inclusive.



## Mineral Production by Provinces, 1907, 1908, and 1909.

Province.	1907.		1908.		1909.	
	Value of Production.	Per cent of total.	Value of Production.	Per cent of total.	Value of Production.	Per cent of total.
	\$	%	\$	%	\$	%
Nova Scotia.....	14,532,040	16·73	14,487,108	16·93	12,504,810	13·62
New Brunswick.....	664,467	0·77	579,816	0·68	657,035	0·71
Quebec.....	6,205,553	7·14	6,372,949	7·45	7,086,265	7·72
Ontario.....	30,381,638	34·98	30,623,812	35·79	37,374,577	40·70
Manitoba.....	898,775	1·03	584,374	0·68	1,193,377	1·30
Saskatchewan.....	533,251	0·61	413,212	0·48	456,246	0·50
Alberta.....	4,657,524	5·36	5,122,505	5·99	6,047,447	6·58
British Columbia.....	25,656,056	29·54	23,704,035	27·71	22,479,006	24·48
North West Territories..	3,335,898	3·84	3,669,290	4·29	4,032,678	4·39
Dominion.....	86,865,202	100·00	85,557,101	100·00	91,831,441	100·00

## Mineral Production of Nova Scotia, 1908 and 1909.

Product.	1908.		1909.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Gold..... Ozs.	11,842	244,799	10,193	210,711
Pig iron from Canadian ore (b)..... Tons.	3,280	60,923	10,452	104,520
Coal..... "	6,652,539	13,364,476	5,652,089	11,354,643
Grindstones..... "	473	4,803	312	3,204
Gypsum..... "	234,455	230,433	345,682	364,379
Limestone (used as flux)..... "	301,180	212,362	.....	*
Barytes..... "	4,312	19,021	179	1,120
Tripolite..... "	30	195	.....	.....
Clay products.....	.....	117,833	.....	188,185
Stone..... (a)	.....	(a)	.....	189,604
Lime..... Bus.	51,068	16,102	57,730	16,729
Other products (a).....	.....	216,161	.....	71,715
Total .....	.....	14,487,108	.....	12,504,810

(a) Includes in 1908 antimony, copper, arsenic, cement, and stone; in 1909 antimony, arsenic, and cement. (b) The total production of pig iron in Nova Scotia in 1908 was 352,642 tons valued at \$3,554,540, and in 1909, 345,380 tons valued at \$3,453,800.

\* In stone.

## Mineral Production of New Brunswick, 1908 and 1909.

Product.	1908.		1909.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Coal.....Tons.	60,000	135,000	49,029	98,496
Grindstones....."	3,370	43,325	3,963	51,460
Gypsum....."	81,620	191,312	98,716	226,975
Mineral water.....		14,894		14,003
Clay products.....		75,513		65,570
Lime.....Bus.		34,262	697,466	154,151
Stone.....	(a)	(a)		42,180
Other products (a).....		85,510		4,200
Total.....		579,816		657,035

(a) Includes in 1908, graphite, stone, etc.

## Mineral Production of Quebec, 1908 and 1909.

Product.	1908.		1909.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Gold.....Ozs.			193	3,990
Copper.....Lbs.	1,282,024	169,330	1,088,212	141,272
Pig iron from Canadian ore (b).....Tons.	5,229	133,492	3,960	104,289
Silver.....Ozs.	13,299	7,030	13,233	6,815
Asbestos and asbestic.....Tons.	90,773	2,573,335	87,300	2,301,773
Chromite....."	7,225	82,008	2,470	26,608
Feldspar....."			97	1,712
Magnesite....."	120	840	330	2,503
Mica....."	148	82,613		93,290
Ochres....."	4,746	30,440	3,940	28,096
Mineral water....."		75,533		68,565
Phosphate....."	598	5,900	525	4,804
Pyrites....."	26,598	159,588	35,300	130,009
Graphite....."	(a)	(a)	134	10,178
Cement.....Bls.	704,492	984,350	1,011,194	1,314,550
Clay products.....		893,717		1,153,830
Lime.....Bus.	857,700	201,357	1,281,827	315,632
Slate.....Squares		13,496	4,000	19,000
Stone.....		(a)		1,359,349
Other products (a).....		959,920		
Total.....		6,372,949		7,086,265

(a) Includes in 1908, graphite, limestone (flux), building stone, calcium carbide, and granite.

(b) The total production of pig iron in Quebec in 1908 was 6,709 tons valued at \$171,383; in 1909, 4,770 tons valued at \$125,623.

There was also in this Province an important production of aluminium from imported ores.

## Mineral Production of Ontario, 1908 and 1909.

Product.		1908.		1909.	
		Quantity.	Value.	Quantity.	Value.
			\$		\$
Copper .....	Lbs.	15,005,171	1,981,883	15,746,699	2,044,237
Gold .....	Ozs.	5,212	66,389	1,569	32,425
Pig iron from Canadian ore (b) .....	Tons.	90,911	1,469,887	135,032	2,013,406
Iron ore (exports) .....	"			21,956	61,954
Nickel .....	Lbs.	19,143,111	8,231,538	26,282,991	9,461,877
Cobalt .....	"		113,423		94,609
Silver .....	Ozs.	19,398,545	10,254,847	24,822,099	12,784,126
Zinc ore .....	Tons.	452	3,215	895	8,950
Arsenic, white and arsenical ore .....	"		42,566		64,100
Calcium carbide .....	"	2,364	147,150		
Corundum .....	"	1,089	100,398	1,491	162,492
Feldspar .....	"	7,877	21,099	12,686	38,664
Graphite .....	"	210	5,040	730	37,624
Gypsum .....	"	10,380	42,456	11,731	48,278
Limestone (as flux) .....	"	114,837	75,966	(c)	(c)
Mica .....	"	288	57,258		54,484
Mineral water .....			61,526		92,610
Natural gas .....			949,297		1,145,307
Peat .....	Tons.	(a)	(a)	60	240
Petroleum .....	Bls.	527,987	747,102	420,755	559,604
Phosphate .....	Tons.	998	8,894	473	3,254
Pyrites .....	"	20,738	65,236	29,344	92,812
Quartz .....	"	44,741	52,530	56,924	71,285
Salt .....	"	79,975	378,798	84,037	415,219
Talc .....	"	1,016	3,048	4,350	10,300
Cement .....	Bls.	1,519,930	1,910,630	2,462,027	3,084,218
Clay products .....			2,461,416		3,425,841
Lime .....	Bus.	2,087,731	358,507	2,619,553	434,147
Stone .....			693,850		748,639
Other products (a) .....			319,563		383,875
Total .....			30,623,812		37,374,577

(a) Includes in 1908 sand-lime brick, sand and gravel (exports), peat, etc.; in 1909, sand-lime brick and sand and gravel (exports). (b) The total production of pig iron in Ontario in 1908 was 271,484 tons valued at \$4,385,271; in 1909, 407,012 tons valued at \$6,002,441. (c) Included in stone.

## Mineral Production in Manitoba, 1908 and 1909.

Product.		1908.		1909.	
		Quantity.	Value.	Quantity.	Value.
			\$		\$
Gypsum .....	Tons.	14,500	111,500	17,000	170,000
Clay products .....			265,091		559,008
Lime .....	Bus.	138,786	24,192	423,954	69,670
Cement .....	Bls.	11,234	16,851	8,600	8,600
Sand-lime brick .....	No.	2,645,000	21,740	6,400,000	54,200
Other products (e) .....			145,000		331,899
Total .....			584,374		1,193,377

(e) Includes building stone etc.



## Mineral Production in Saskatchewan, 1908 and 1909.

Product.	1908.		1909.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Coal..... Tons.	150,566	253,790	192,125	296,339
Brick..... No.	8,262,996	87,566	14,416,770	144,316
Other products (a).....		71,856		15,591
Total.....		413,212		456,246

(a) Includes in 1908, sand-lime brick, etc.; in 1909, sand-lime brick, fireclay, etc.

## Mineral Production in Alberta, 1908 and 1909.

Product.	1908.		1909.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Gold..... Ozs.	50	1,037	25	525
Coal..... Tons.	1,685,661	4,127,311	1,994,741	4,838,109
Natural gas.....		63,363		61,722
Clay products.....		240,384		442,486
Other products (a).....		690,410		637,255
Total.....		5,122,505		6,047,447

(a) Includes cement, lime, stone, etc.

## Mineral Production in British Columbia, 1908 and 1909.

Product.	1908.		1909.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Copper..... Lbs.	(a) 47,274,614	6,244,031	(b) 35,658,952	4,629,245
Gold..... Ozs.	286,858	5,929,889	250,320	5,174,579
Lead..... Lbs.	43,195,733	1,814,221	45,857,424	1,692,139
Silver..... Ozs.	2,631,389	1,391,058	2,649,141	1,364,387
Zinc ore.....		17,476		233,749
Coal..... Tons.	2,333,708	7,292,838	2,606,127	8,144,147
Clay products.....		344,446		470,402
Lime..... Bus.	176,435	44,027	231,269	75,076
Stone.....				365,081
Other products.....		(c) 643,534		(d) 330,201
Total.....		23,704,035		22,479,006

(a) Copper content of ores shipped. (b) Smelter recoveries of copper. (c) Includes cement, stone, sand-lime brick, etc. (d) Includes cement, sand-lime brick, and small value in refined antimony.

## Mineral Production in Yukon, 1908 and 1909.

Product.	1908.		1909.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Copper..... Lbs.	112,264	14,828	.....	.....
Gold..... Ozs.	174,150	3,600,000	191,565	3,960,000
Silver..... "	63,000	33,304	45,000	23,176
Coal..... Tons.	3,847	21,158	7,364	49,502
Total .....	.....	3,669,290	.....	4,032,678

# MINERAL PRODUCTION BY PROVINCES, 1899-1909

—	Nova Scotia.	New Brunswick.	Quebec.	Ontario.	Manitoba.	Alberta.	Saskatchewan.	Yukon.	British Columbia.	Total.
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
1899.....	6,817,274	420,227	2,585,635	9,819,557		17,108,707			12,482,605	49,234,005
1900.....	9,298,479	439,060	3,292,383	11,258,099		23,452,330			16,680,526	64,420,877
1901.....	7,770,159	467,985	3,759,984	13,970,010		19,297,940			20,531,833	65,797,911
1902.....	10,686,549	607,129	3,743,636	14,613,091		16,127,400			17,448,031	63,231,836
1903.....	11,431,914	580,495	3,585,938	14,160,033		14,082,986			17,899,147	61,740,513
1904.....	11,212,746	559,913	3,688,482	12,582,843		12,713,613			14,325,174	60,082,771
1905.....	11,507,047	559,035	4,405,975	18,833,292		11,387,642			22,386,008	69,078,999
1906.....	12,894,303	646,328	5,242,058	25,111,682		10,092,726			25,299,600	79,286,697
1907.....	14,532,040	664,647	6,205,553	30,381,638	898,775	4,657,524	533,251	3,335,898	25,656,056	86,865,202
1908.....	14,487,108	579,816	6,372,949	30,623,812	584,374	5,122,505	413,212	3,669,290	23,704,035	85,557,101
1909.....	12,504,810	657,035	7,086,265	37,374,577	1,193,377	6,047,447	456,246	4,032,678	22,479,006	91,831,441

## METALLIC PRODUCTS.

### SMEILTER PRODUCTION.

Complete statistics of the production of copper and lead smelters, showing the ore treated, the matte, blister, base bullion or refined metals produced, etc., were collected for the first time by this Branch in 1908, and were published in the report of that year. Complete statistics have also been received, covering the year 1909, through the courtesy of the following operating companies:—

The Mond Nickel Company.. . . .	Victoria Mines, Ont.
The Canadian Copper Company . . . .	Copper Cliff, Ont.
The Coniagas Reduction Company.. . .	Thorold, Ont.
The Deloro Mining and Reduction Company,	Deloro, Ont.
The Consolidated Mining and Smelting Com-	
pany of Canada.. . . .	Trail, B.C.
<sup>1</sup> The Northport Smelting and Refining Com-	
pany.. . . .	Northport, Wash., U.S.A.
The Granby Consolidated Mining, Smelting,	
and Power Company.. . . .	Grand Forks, B.C.
The British Columbia Copper Company,	
Limited.. . . .	Greenwood, B.C.
The Tyee Copper Company, Limited.. . .	Ladysmith, B.C.
The Canadian Antimony Company.. . . .	St. George, N.B.

The aggregate quantity of ores and concentrates treated in these works during 1909 was 2,374,615 tons, as compared with 2,218,395 tons in 1908.

These ores may be conveniently classified as shown in the following table:—

	1908.	1909.
Nickel-copper ores. . . . .	360,180	462,336
Silver-cobalt-nickel-arsenic ores. . . . .	7,182	8,384
Lead and other ores treated in lead furnaces. . . . .	53,545	53,006
Copper-gold-silver ores. . . . .	1,797,488	1,850,889
Total. . . . .	2,218,395	2,374,615

The products obtained in Canada from the treatment of these ores include: refined lead produced at Trail, B.C., and fine gold, fine silver, copper sulphate, and antimony produced from the residues of the lead refinery; silver bullion, white arsenic, nickel oxide and cobalt oxide produced in Ontario, from the Cobalt

<sup>1</sup> The Northport smelter treats Canadian ore, almost exclusively, and for statistical purposes is considered as if located in Canada.



District ores; refined antimony, produced in New Brunswick. In addition to these refined products, blister copper, copper matte, nickel-copper matte, and speiss resulting from the treatment of the Cobalt ores, are produced and exported for refining outside of Canada.

The aggregate results of smelting and refining operations may be summarized as shown in the next table. Unfortunately the figures cannot be taken to represent the total production from smelting ores mined in Canada, since considerable quantities of copper and silver ores are still shipped to other smelters outside of Canada, for smelting.

It should also be explained that the figures include the results of the treatment of a small quantity of imported ores.

### Smelter and Refinery Production in Canada, 1908 and 1909.

		1908.		1909.	
		Refined Products.	Metals contained in matte, blister, base bullion, and speiss.	Refined Products.	Metals contained in matte, blister, base bullion, and speiss.
Antimony.....	Lbs.			61,207	
Gold.....	Ozs.	15,436	203,300	18,241	200,129
Silver.....	"	11,168,689	3,271,899	14,242,545	4,845,920
Lead.....	Lbs.	36,549,274	1,116,792	41,883,614	3,973,810
Copper.....	"		51,965,289		53,328,583
Copper sulphate.....	"	203,379		51,405	
Nickel.....	"		19,506,251		27,041,957
Cobalt.....	"		692,170		1,321,085
White arsenic.....	"	1,431,052		2,258,087	
Arsenic.....	"		436,787		1,074,516

Smelter products exported for refining were: blister copper carrying gold and silver values, 14,239 tons in 1909, as compared with 15,418 tons in 1908; copper matte carrying gold and silver values, 11,597 tons in 1909, as against 7,649 tons in 1908; Bessemer nickel-copper matte carrying small gold and silver values, as well as metals of the platinum group, 25,845 tons in 1909, and 21,210 tons in 1908; lead bullion carrying gold and silver values, 2,010 tons in 1909. Speiss resulting from the treatment of the Cobalt ores, carrying silver, cobalt, nickel, and arsenic values, was in 1909, 2,660 tons, as compared with 1,326 tons in 1908; this is partly exported and partly held for future treatment.

*Nickel-Copper Ores.*—The smelters of the Canadian Copper Company at Copper Cliff, and the Mond Nickel Company at Victoria Mines treat the nickel-copper ores of the district. These ores consist of pyrrhotite and chalcopyrite, the nickel being chiefly contained in the mineral pentlandite disseminated through the ore. The greater part of the ore is roasted in open heaps. In 1908,<sup>1</sup> the total quantity of ore mined was 409,551 tons, while the quantity smelted was 360,180 tons. The quantity of Bessemer matte shipped was 21,210 tons, con-

<sup>1</sup> See also the statistics given in the chapter on nickel.

taining 7,503 tons of copper and 9,572 tons of nickel. In 1909 the quantity of ore mined was 451,892 tons, while the quantity smelted was 462,336 tons. The quantity of Bessemer matte produced was 25,845 tons, containing 7,873 tons copper and 13,141 tons of nickel.

Statistics of the smelter production from these ores are available practically since the commencement of the industry, and are shown in the following table:—

### Smelter Production of the Nickel Copper Ores of the Sudbury District.

Calendar Year.	Ore Mined.	Ore Smelted.	Matte Shipped.	Value of Matte.	Nickel content of Matte.	Copper content of Matte.
	Tons.	Tons.	Tons.	\$	Tons.	Tons.
1886.....	3,307	30,000?			900?	1,500?
1887.....	567					
1888.....						
1889.....	44,990	40,146	3,274		432	733
1890.....					718	651
1891.....	83,300	72,558	10,336		2,018	2,064
1892.....	74,381	57,022			1,207	1,102
1893.....			9,425		1,991	1,821
1894.....	103,223	96,038	11,681	766,422	2,454	2,604
1895.....	74,135	68,618	10,188	890,834	1,944	2,288
1896.....	94,966	71,027	10,759	416,594	1,699	1,584
1897.....	93,154	96,370	13,968		1,999	2,750
1898.....	123,820	121,924			2,759	4,187
1899.....	159,957	172,761		702,341	2,872	2,834
1900.....	156,420		23,336	1,076,306	3,540	3,364
1901.....	315,692	255,958		1,661,839	4,594	4,318
1902.....	269,538	211,847	25,311	1,327,448	5,347	3,553
1903.....	136,033	207,030	13,832	2,686,469	6,253	3,576
1904.....	203,388	118,470	10,154	2,193,198	5,274	2,455
1905.....	277,766	251,421	17,405	4,019,814	9,438	4,386
1906.....	343,814	340,059	20,310	4,628,011	10,745	5,264
1907.....	351,916	359,076	22,025	3,289,382	10,595	6,996
1908.....	409,551	360,180	21,210	2,930,989	9,572	7,503
1909.....	451,892	462,336	25,845	3,913,012	13,141	7,873

*Silver-Cobalt-Nickel-Arsenic ores.*—The rich silver ores of the Cobalt district, the first shipments of which were made in 1904, are still for the most part shipped out of Canada, even for first treatment.

The Canadian Copper Company established works for the treatment of these ores at Copper Cliff in 1906, at which silver bullion and white arsenic are recovered. The Coniagas Reduction Company has built a plant at Thorold, Ont., for the treatment of the ores of the Coniagas mine and also custom ore, and it is equipped to recover silver bullion and white arsenic; nickel oxide and cobalt this an important feature of its operations. The Deloro Mining and Reduction oxide have also been recovered at this plant, and the Company expects to make Company has established works at Deloro, Ont., for the recovery of gold and silver bullion and white arsenic, with the object of treating not only Cobalt District silver ores, but also the auriferous arsenical pyrites of Hastings county.

This Company also proposes to recover nickel and cobalt as oxide. The treatment of these ores in Ontario in 1908 and 1909 gave the following results:—

		1908.	1909.
Ore treated.....	Tons.	7,182	8,384
Products recovered : <sup>1</sup>			
Silver produced <sup>2</sup> .....	Ozs.	9,212,650	12,239,542
White arsenic.....	Lbs.	1,431,052	2,258,087
Speiss or residues.....	Tons.	1,326	2,660
Metallic contents of speiss :			
Silver.....	Ozs.	2,612,344	4,103,251
Nickel.....	Lbs.	363,140	758,966
Cobalt.....	"	692,170	1,321,083
Arsenic.....	"	436,787	1,074,516

<sup>1</sup> Nickel oxide and cobalt oxide were also produced in small quantities.

<sup>2</sup> Fine ounces contained in silver bullion, fineness ranging from 850 to 998.

*Lead Ores.*—There was but one lead smelting plant in operation in Canada in 1909, viz., that at Trail, B.C., operated by the Consolidated Mining and Smelting Company of Canada, Limited. This smelter is supplemented by a lead refinery employing the Betts Electrolytic Process and having a capacity of 100 tons per day. The main ore supply comes from the St. Eugene mine, owned by the same Company, though practically all the lead ore produced in the Slocan district is smelted as customs ore. Supplementing the lead ores is a small tonnage of gold and silver ores, with some gold concentrates from stamp mills.

In the refinery, the bullion from the smelter is cast into anodes and redeposited electrolytically upon cathode starting sheets of refined lead. The refined lead is cast into pigs of 100 pounds and 180 pounds weight, the latter being a special form for the Chinese trade.

The slimes from the tank room carry gold, silver, antimony, arsenic, and copper. The first two are recovered as fine metals, and the copper as copper sulphate.

Antimony is recovered, though not regularly, and bearing metal is manufactured.

The annual production of refined lead, fine gold and silver, and of copper sulphate has been as follows:—

Calendar Year.	Refined Lead.	Fine Gold.	Fine Silver.	Copper Sulphate.
	Lbs.	Ozs.	Lbs.	Lbs.
1904.....	7,519,440	4,336	551,450	56,000
1905.....	15,804,509	8,602	1,088,328	77,175
1906.....	20,471,314	9,993	1,263,809	143,135
1907.....	26,607,461	10,395	1,631,422	97,751
1908.....	36,549,274	15,346	1,956,039	203,379
1909.....	41,883,614	18,241	2,003,003	51,405

*Gold-Silver-Copper Ores of British Columbia.*—There are six copper smelters in British Columbia, in addition to the smelter at Northport, Wash., U.S.A., treating these complex ores.

The ores of the Rossland camp, of which gold is the chief constituent value, are smelted in the Trail copper furnace or the Consolidated Mining and Smelting Company, and at the Northport smelter. The low grade copper ores of the Boundary district are smelted locally at Grand Forks, Greenwood, and Boundary Falls, some also going to Trail.

On the coast the ores of this class are smelted at Ladysmith and Crofton, but a considerable tonnage is also shipped to United States smelters for treatment, while the local smelters are receiving some foreign ores. The Crofton smelter, which was not in operation during 1908 or 1909, is owned by the Britannia Copper Syndicate, Limited. The Boundary Falls smelter, also, was out of commission throughout 1909.

The aggregate production of these smelters in 1908 and 1909, including the foreign ores treated, was as follows:—

	1908.	1909.
Ore smelted..... Tons.	1,797,488	1,850,889
Smelter products:		
Matte..... "	7,649	11,597
Blister..... "	15,418	14,239
Metallic content of matte and blister:		
Gold..... Ozs.	202,959	198,898
Silver..... "	631,484	612,164
Copper..... Lbs.	36,960,118	37,581,884

*Trail Smelter.*—Statistics of the production of the Trail smelter, including both the copper and lead smelters, have been published in the annual reports of the Company, the figures since 1906 having been as follows:—

#### Production of Trail Smelter.

Year Ending June 30.	Ore Smelted.	METALS CONTAINED IN MATTE AND BULLION PRODUCED.			
		Gold.	Silver.	Lead.	Copper.
	Tons.	Ozs.	Ozs.	Lbs.	Lbs.
1906 (6 mos. only).....	157,649	64,590	1,074,255	15,133,683	2,399,161
1907.....	222,573	69,168	1,100,271	20,383,083	3,443,310
1908.....	305,956	121,380	2,224,888	32,157,139	4,004,468
1909.....	347,417	114,920	2,443,475	43,675,077	4,637,631
1910.....	487,125	137,614	2,162,406	42,368,816	5,974,959
Production from 1894 to June, 1910.	2,458,684	952,056	16,999,873	220,872,555	43,453,814

*Granby Smelter.*—The smelting plants of the Boundary district are of particular interest on account of the low grade ore treated. These ores vary from 1 to 3 per cent in copper and from \$1 to \$3 in gold and silver, and over 1,000,000 tons are now annually smelted. There are three smelters in the district, the largest being that at Grand Forks operated by the Granby Consolidated



Mining, Smelting, and Power Company. The first furnace, of 300 tons capacity, was completed in 1890, and since that date the capacity of the plant has from time to time been increased, until at present there are eight furnaces with a capacity of about 4,500 tons per day. The converter plant, which was first installed in 1902, has now a capacity of 40,000,000 pounds per year.

The quantities of ores smelted and the total production of metals, shown in the next table, are as published in the Annual Report of the Company for the year ending June 30, 1910.

### Ore Smelted and Metals Recovered at Granby Smelter.

Year ending June 30.	ALL MATERIAL SMELTED.				METALS PRODUCED.		
	Granby ore.	Foreign.		Total.	Gold.	Silver.	Copper.
		Ore.	Matte.				
Tons.	Tons.	Tons.	Tons.	Ozs.	Ozs.	Lbs.	
1901. ....	169,087	7,832	.....	176,919	8,871	34,990	5,435,955
1902. ....	293,645	4,454	3,001	301,100	30,786	274,511	10,836,851
1903. ....	289,583	7,691	6,223	303,497	35,121	277,574	12,551,758
1904. ....	516,059	33,182	4,290	556,531	54,493	275,935	16,020,986
1905. ....	550,738	39,382	.....	590,120	42,980	215,449	14,224,692
1906. ....	796,188	36,158	.....	832,346	50,020	316,947	19,939,004
1907. ....	649,022	16,893	.....	665,915	32,738	201,337	16,410,576
1908. ....	858,432	24,179	.....	882,611	40,068	300,204	21,092,288
1909. ....	964,789	19,944	.....	984,733	45,760	335,520	21,901,528
1910. ....	1,175,548	21,829	.....	1,197,377	48,752	356,746	22,754,899
Total. ....	6,263,091	214,544	13,514	6,491,149	389,589	2,589,213	161,168,537

*Greenwood Smelter.*—At this plant, owned by the British Columbia Copper Company, there are three large furnaces, each having a smelting capacity of from 650 to 750 tons per day.

In the Annual Report of the Company for the year ending November 30, 1909, the General Manager, Mr. J. E. McAllister, refers to the smelting operations as follows:—

‘Operations at the Reduction Works are under the superintendence of Mr. E. G. Warren, and various improvements have been added to the plant, chief among which is the additional storage bin capacity for 1,000 tons of coke. The three blast furnaces (48" × 240" at the tuyeres) were in operation for 623 furnace days, the failure of the coke supply causing a loss of approximately 290 furnace days.

The average tonnage handled, exclusive of coke, during the period of operation, was 599.2 tons per furnace each twenty-four hours, making a total of:—

	Tons.
B.C. Copper Co.'s ores .....	362,423
Customs ores .....	6,964
Converter slag .....	3,949
	<hr/> 373,336

Included in the item of converter slag is an amount of 1,588 tons of custom ore and clay used in converter linings. From the above material handled, blister copper to the amount of 6,366,318 pounds has been recovered, containing:—

Fine copper.....	6,325,000 lbs.
Gold.....	18,244 ozs.
Silver.....	64,234 ozs.

*Operating Costs.*—A comparison of figures with those of the year 1908 is as follows:—

	1909.	1908.
Yield of copper per ton of B.C.C. Co.'s ores.....	17·7 lbs.	17·8 lbs.
Yield of gold and silver per ton, B.C.C. Co.'s ores.....	\$1.03	\$0.985
Average price realized for copper.....	13·08 cents.	13·604 cents.
Cost of producing, refining, and marketing per pound of fine copper, after crediting expenditure with gold and silver values	9·829 cents.	9·996 cents.
Cost per ton of ore handled, including all charges from ore in place to sale of the contained metals .....	\$2.683	\$2.632

*The Ladysmith Smelter.*—This smelter is owned and operated by the Tye Copper Company, and was the only one in operation on the coast during 1908 and 1909. Both domestic and imported ores are treated, but the Company has not published details of its smelter operations during the past year.

## COPPER.

The total production of copper in Canada in 1909, estimated on the basis of smelter recovery from ores treated, was 52,493,863 pounds, which, at the average price of copper for the year in New York—12.982 cents per pound—would be worth \$6,814,754.

The copper production in 1908, compiled on a similar basis, was estimated at about 52,928,386 pounds, showing a slight falling off in production in 1909. The average New York price for copper in 1908 was 13.208 cents, the falling off in price in 1909 being 0.226 cents or 1.7 per cent.

In the Province of British Columbia the copper production is mainly derived from ores carrying a very low content of copper metal. In the smelting of these ores the copper losses in slag are quite considerable, reaching as high in some cases as 25 per cent or more of the copper content of the ore. With ores of this character there is, therefore, a wide difference between the copper content of ore shipped from the mine and the copper metal recovered by the smelters.

The statistics of copper production for the years previous to 1909, as given in Tables 1 and 2, include for British Columbia a record of the copper production in that Province as collected by the Provincial Bureau of Mines. These are compiled on the basis of the total metal content of the ores sent to smelters for which smelter returns were received during the year, and these show a relatively higher copper production than the figures published for the Province of Ontario, which are based on copper content of matte produced.

The independent collection of statistics of smelter production by this Branch through the courtesy of the smelter operators, has made possible the compilation and publication of statistics of production based on smelter recoveries as given above, thus providing for a more equitable comparison of the production of the several provinces and of the production of Canada with other countries.

COPPER.—TABLE 1.  
Production by Provinces, 1907 to 1909.

Province.	1907.		1908.		1909.†	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
		\$		\$		\$
Quebec. ....	1,517,990	303,659	1,282,024	169,330	1,088,212	141,272
Ontario. ....	14,104,337	2,821,432	15,005,171	1,981,883	15,746,699	2,044,237
British Columbia. . .	40,832,720	8,168,177	47,274,614	6,244,031	35,656,952	4,629,245
Other districts * ...	524,158	104,852	141,064	18,632	.....	.....
Total. ....	56,979,205	11,398,120	63,702,873	8,413,876	52,493,863	6,814,754

\* Includes Nova Scotia and Yukon.

† The apparent large decrease in British Columbia copper production in 1909, as compared with 1908, is mainly due to the different basis of compilation adopted in 1909, for explanation of which see the text. The British Columbia copper production in 1909, based on copper content of ores sent to smelters, was 45,597,245 pounds (see Tables 8 and 9).

With the exception of the production of a small quantity of copper sulphate produced at Trail, B.C., the copper production of Canada is practically all exported. The exports of copper in ore, matte, regulus, etc., from Canada during the calendar year 1909 are reported by the Customs Department as 54,447,750 pounds, of which, 50,775,802 pounds were exported to the United States, and 3,671,933 pounds to Great Britain.

The exports in 1908 were recorded as 51,136,371 pounds. These figures agree fairly closely with the statistics of smelter recovery.

*Prices:* The average monthly prices in cents per pound of electrolytic copper in New York, and in £ sterling per long ton of standard copper in London, are shown for a period of five years in the accompanying table.

### Monthly Average Prices of Electrolytic Copper in New York.

Months.	1905.	1906.	1907.	1908.	1909.
	Cts.	Cts.	Cts.	Cts.	Cts.
January.....	15·008	18·310	24·404	13·726	13·893
February.....	15·011	17·869	24·869	12·905	12·949
March.....	15·125	18·361	25·065	12·704	12·387
April.....	14·920	18·375	24·224	12·743	12·563
May.....	14·627	18·475	24·048	12·598	12·893
June.....	14·673	18·442	22·665	12·675	13·214
July.....	14·888	18·190	21·130	12·702	12·880
August.....	15·664	18·380	18·356	13·462	13·007
September.....	15·965	19·033	15·565	13·388	12·870
October.....	16·279	21·203	13·169	13·354	12·700
November.....	16·599	21·833	13·391	14·130	13·125
December.....	18·328	22·885	13·163	14·111	13·298
Yearly Average....	15·590	19·278	20·004	13·208	12·982

In London the monthly average prices of standard copper were as shown hereunder, in £ per ton of 2,240 pounds.

### Monthly Average Prices of Standard Copper in London.

Months.	1905.	1906.	1907.	1908.	1909.
	£	£	£	£	£
January.....	68·262	78·869	106·739	62·386	57·688
February.....	67·963	78·147	107·356	58·786	61·197
March.....	68·174	81·111	106·594	58·761	56·231
April.....	67·017	84·793	98·625	58·331	57·363
May.....	64·875	84·867	102·375	57·387	59·338
June.....	65·881	83·994	97·272	57·842	59·627
July.....	66·887	81·167	95·010	57·989	58·556
August.....	69·830	83·864	79·679	60·500	59·393
September.....	69·667	87·831	68·375	60·338	59·021
October.....	71·406	97·269	60·717	60·139	57·551
November.....	74·727	100·270	61·226	63·417	58·917
December.....	78·993	105·226	60·113	62·943	59·906
Yearly Average....	69·465	87·232	87·007	59·902	58·732



The price of copper during 1909 varied but slightly; the highest being about 14½ cents in January, and the lowest 12¼ in April.

Statistics showing the annual copper production in Canada since 1886 are given in Table 2, which shows the yearly increase or decrease as the case may be, and also the average yearly price per pound in New York.

COPPER.—TABLE 2.

## Annual Production.

Calendar Year.	Lbs.	Increase or Decrease.		Value.	Increase or Decrease.		Average Price per Pound.
		Lbs.	%		\$	%	
				\$			Cts.
1886.....	3,505,000			385,550			11·00
1887.....	3,260,424	(d) 244,576	6·99	366,798	d) 18,752	4·86	11·25
1888.....	5,562,864	2,302,440	70·60	927,107	560,309	152·70	16·66
1889.....	6,809,752	1,246,888	22·40	936,341	9,234	0·99	13·75
1890.....	6,013,671	(d) 796,081	11·69	947,153	10,812	1·15	15·75
1891.....	9,529,401	3,515,730	58·46	1,226,703	279,550	29·51	12·87
1892.....	7,087,275	2,442,126	25·63	818,580	(d) 408,123	33·27	11·55
1893.....	8,109,856	1,022,381	14·40	871,809	53,229	6·50	10·75
1894.....	7,708,789	(d) 401,067	4·94	736,960	(d) 134,849	15·46	9·56
1895.....	7,771,639	62,850	0·81	836,228	99,268	13·47	10·76
1896.....	9,393,012	1,621,373	20·86	1,021,960	185,732	22·21	10·88
1897.....	13,300,802	3,907,790	41·60	1,501,660	479,700	46·94	11·29
1898.....	17,747,136	4,446,334	33·43	2,134,980	633,320	42·17	12·03
1899.....	15,078,475	(d) 2,668,661	15·04	2,655,319	520,339	24·37	17·61
1900.....	18,937,138	3,858,663	25·59	3,065,922	410,603	15·46	16·19
1901.....	37,827,019	18,889,881	99·75	6,096,581	3,030,659	98·84	16·117
1902.....	38,804,259	977,240	2·58	4,511,383	(d) 1,585,198	26·00	11·626
1903.....	42,684,454	3,880,195	10·00	5,649,487	1,138,104	25·23	13·235
1904.....	41,383,722	(d) 1,300,732	3·05	5,306,635	(d) 342,852	6·07	12·823
1905.....	48,092,753	6,709,031	16·21	7,497,660	2,191,025	41·29	15·590
1906.....	55,609,888	7,517,135	15·63	10,720,474	3,222,814	42·98	19·278
1907.....	56,979,205	1,369,317	2·46	11,398,120	677,654	6·32	20·004
1908.....	63,702,873	6,723,668	11·80	8,413,876	2,984,244	26·18	13·208
1909*.....	52,493,863			6,814,754			12·982

\* The decrease is not as large as the figures would indicate because of the calculation of part of the 1909 production on a different basis from previous years. See explanation in text.

Statistics of the exports of copper as collected by the Customs Department are shown in Table 3, and statistics of imports in Tables 4 and 5.

The total imports of copper in so far as weights are given, amounted in 1909 to 16,330,480 pounds, a quantity far exceeded by the production.

COPPER.—TABLE 3.

## Exports of Copper in Ore, Matte, etc.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1885.....		262,600	1898.....	11,572,381	840,243
1886.....		249,259	1899.....	11,371,766	1,199,908
1887.....		137,966	1900.....	23,631,523	1,741,885
1888.....		257,260	1901.....	32,488,872	3,404,908
1889.....		168,457	1902.....	26,094,498	2,476,516
1890.....		398,497	1903.....	38,364,676	3,873,827
1891.....		348,104	1904.....	38,553,282	4,216,214
1892.....		277,632	1905.....	40,740,861	5,443,873
1893.....	4,792,201	269,160	1906.....	42,398,538	7,303,366
1894.....	1,625,389	91,917	1907.....	54,688,450	8,749,609
1895.....	3,742,352	236,965	1908.....	51,136,371	5,834,559
1896.....	5,462,052	281,070	1909.....	54,447,750	5,832,246
1897.....	14,022,610	850,336			

COPPER.—TABLE 4.

## Imports of Pig, Old, Scrap, etc.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	31,900	2,130	1895.....	72,062	6,770
1881.....	9,800	1,157	1896.....	86,905	9,226
1882.....	20,200	1,984	1897.....	49,000	5,449
1883.....	124,500	20,273	1898.....	1,050,000	80,000
1884.....	40,200	3,180	1899.....	1,655,000	246,740
1885.....	28,600	2,016	1900.....	1,144,000	180,990
1886.....	82,000	6,969	1901.....	951,500	152,274
1887.....	40,100	2,507	1902.....	1,767,200	225,832
1888.....	32,300	2,322	1903.....	2,038,400	252,594
1889.....	32,300	3,288	1904.....	2,115,300	270,315
1890.....	112,200	11,521	1905.....	1,944,400	266,548
1891.....	107,800	10,452	1906.....	2,627,700	441,854
1892.....	343,600	14,894	1907 (9 mos.).....	2,616,600	520,971
1893.....	168,300	16,331	1908.....	3,612,400	650,597
1894.....	101,200	7,397	1909.....	2,732,300	383,441
1909 { Copper, old and scrap or in blocks..... Duty free.				127,800	12,949
Copper in pigs or ingots..... "				2,604,500	370,492
Total 1909.....				2,732,300	383,441

COPPER.—TABLE 5.  
Imports of Manufactures.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	123,061	1890.....	472,668	1900.....	1,090,280
1881.....	159,163	1891.....	563,522	1901.....	951,045
1882.....	220,235	1892.....	422,870	1902.....	1,281,522
1883.....	247,141	1893.....	458,715	1903.....	1,291,635
1884.....	134,534	1894.....	175,404	1904.....	1,191,610
1885.....	181,469	1895.....	251,615	1905.....	1,775,881
1886.....	219,420	1896.....	285,220	1906.....	2,660,303
1887.....	325,365	1897.....	264,587	1907 (9 mos.).....	2,545,600
1888.....	303,459	1898.....	786,529	1908.....	2,713,060
1889.....	402,216	1899.....	551,586	1909.....	2,086,205

	Duty.	Lbs.	Value.
			\$
Copper in bars and rods, in coils, or otherwise, in lengths not less than 6 feet, unmanufactured.....	Free.	10,978,000	1,522,600
Copper, in strips, sheets or plates, not planished or coated, etc.....	"	2,285,400	372,299
Copper tubing in lengths not less than 6 feet, and not polished, bent or otherwise manufactured.....	"	334,780	71,587
Copper rollers, for use in calico printing.....	"		1,126
Copper and manufactures of :—			
Nails, tacks, rivets, and burrs or washers.....	30 %		2,085
Wire, plain, tinned or plated.....	15 "		36,885
Wire cloth, etc.....	25 "		5,882
All other manufactures of, N.O.P.....	30 "		73,641
Total.....		13,598,180	2,086,205

### Nova Scotia.

No copper was produced during the year, but the Lake Copper Company is reported to have 1,200 tons of ore on the dumps at Lochaber from development work. Development was also carried on at several other properties.

### Quebec.

The copper production of Quebec in 1909 was as usual from the pyritic ores of the Eustis mines in the Eastern Townships. Mr. Denis, in his report on mining operations in the Province of Quebec, gives the total shipments of ore in 1909 as 35,100 tons.

Statistics of copper production in this Province since 1886, are shown in Table 6.

COPPER.—TABLE 6.  
Quebec:—Production.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1886 .....	3,340,000	367,400	1898 .....	2,100,235	252,658
1887 .....	2,937,900	330,514	1899 .....	1,632,560	287,494
1888 .....	5,562,864	927,107	1900 .....	2,220,000	359,418
1889 .....	5,315,000	730,813	1901 .....	1,527,442	246,178
1890 .....	4,710,606	741,920	1902 .....	1,640,000	190,666
1891 .....	5,401,704	695,469	1903 .....	1,152,000	152,467
1892 .....	4,833,480	564,042	1904 .....	1,760,000	97,455
1893 .....	4,468,352	480,348	1905 .....	621,243	252,752
1894 .....	2,176,430	208,067	1906 .....	1,981,169	381,930
1895 .....	2,242,462	241,288	1907 .....	1,517,990	303,659
1896 .....	2,407,200	261,903	1908 .....	1,282,024	169,330
1897 .....	2,474,970	279,424	1909 .....	1,088,212	141,272

### Ontario.

There is as yet comparatively little copper production in this Province outside that obtained from the nickel-copper ores of the Sudbury district. In 1909 productive operations were carried on at the Herminia and Bruce mines, also by the Canadian Copper Company at the Crean Hill and Creighton mines, and by the Mond Nickel Company at Victoria mines.

The total production of nickel-copper ore in 1909 was 451,892 tons, while the ore charged to the smelters, consisting in part of roasted ores, was 462,336 tons. There was produced during the year 25,845 tons of Bessemer matte containing 7,873 tons of copper, and 13,141 tons of nickel, the shipping value of the matte being approximately \$3,913,017. In 1908 there were 360,180 tons of ore smelted, producing 21,197 tons of matte valued at \$2,930,989.

Details of the production from these ores are given somewhat more completely and in tabular form, in the article on nickel, also under smelter production, pages 25 and 26, to which reference may be made.

Statistics of the copper production of Ontario since 1886 are given in Table 7.

COPPER.—TABLE 7.  
Ontario:—Production.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1886 .....	165,000	18,150	1898 .....	8,375,223	1,007,539
1887 .....	322,524	36,284	1899 .....	5,723,324	1,007,877
1888 .....	Nil.	Nil.	1900 .....	6,740,058	1,091,215
1889 .....	1,466,752	201,678	1901 .....	8,695,831	1,401,507
1890 .....	1,303,065	205,233	1902 .....	7,408,202	861,278
1891 .....	4,127,697	531,234	1903 .....	7,172,533	949,285
1892 .....	2,203,795	254,538	1904 .....	4,913,594	630,070
1893 .....	3,641,504	391,461	1905 .....	8,779,259	1,368,686
1894 .....	5,207,679	497,854	1906 .....	10,638,231	2,050,838
1895 .....	4,576,337	492,414	1907 .....	14,104,337	2,821,432
1896 .....	3,167,256	344,598	1908 .....	15,005,171	1,981,883
1897 .....	5,500,652	621,023	1909 .....	15,746,699	2,044,237



## British Columbia.

According to the returns received by the Mines Branch from the British Columbia smelters, the total quantity of copper contained in matte, blister, and copper sulphate produced in British Columbia smelters during 1909, including the Northport smelter in Washington State, and including an estimate of smelter recovery for the copper ores exported, was 35,658,952 pounds, after deducting the amount of copper produced from foreign ores. The 1908 production on a similar basis was 37,041,115 pounds. Returns of smelter production in this Province were not collected by this Department previous to 1908, and a complete record of statistics of production on this basis is not available.

The production of copper in this Province according to statistics collected and published by the Provincial Bureau of Mines, reached a total in 1909 of 45,597,245 pounds, a decrease of 1,677,369 pounds from 1908 or 3.5 per cent. These figures represent the total quantity of metal contained in the ores sent to the smelters for which returns were received during the year, being based on assay values per 2,000 pounds, or total gross contents per lot, without smelter deductions.

Statistics of the annual production since 1894, as ascertained by the Provincial Bureau of Mines, are shown in Table 8, and by districts since 1906 in Table 9. It will be seen that in 1909 the ores of the Boundary district produced about 89 per cent of the total, the Rossland mines about 8 per cent, and the Coast district less than 3 per cent.

COPPER.—TABLE 8.

## British Columbia:—Copper Content of Ores Shipped.†

Calendar Year.	Copper contained in ores, shipped	Increase.		Value.
	Lbs.	Lbs.	%	
1894.....	324,680	.....	.....	\$ 31,039
1895.....	952,840	628,160	193	102,526
1896.....	3,818,556	2,865,716	301	415,459
1897.....	5,325,180	1,506,624	39	601,213
1898.....	7,271,678	1,946,498	36	874,783
1899.....	7,722,591	450,913	6	1,359,948
1900.....	9,977,080	2,254,489	29	1,615,289
1901.....	27,603,746	17,626,666	177	4,448,896
1902.....	29,636,057	2,032,311	7	3,445,488
1903.....	34,359,921	4,723,864	16	4,547,735
1904.....	35,710,128	1,350,207	3.7	4,579,110
1905.....	37,692,251	1,982,123	5.6	5,876,222
1906.....	42,990,488	5,298,237	14.1	8,287,706
1907.....	40,832,720	*2,157,768	*5.02	8,168,177
1908.....	47,274,614	6,441,894	15.8	6,244,031
1909.....	45,597,245	*1,677,369	*3.6	5,918,522

† As published by British Columbia Bureau of Mines.  
\* Decrease.

## COPPER.—TABLE 9.

## British Columbia:—Production\* by Districts.

	1906.	1907.	1908.	1909.
	Lbs.	Lbs.	Lbs.	Lbs.
Cassiar.....	293,269	674,887	490,873	137,651
East Kootenay.....	6,910			
West Kootenay—				
Nelson.....	216,034	434,222	53,243	186,572
Slocan.....	2,861			
Trail Creek.....	4,750,110	5,080,275	5,042,244	3,509,909
All other.....	1,145			
Yale—				
Boundary.....	32,226,782	31,521,550	40,178,521	40,603,042
Ashcroft, Kamloops.....	355,377	38,706	3,269	
Coast districts.....	5,138,000	3,083,080	1,506,464	1,160,071
	42,990,488	40,832,720	47,274,614	45,597,245

\*Copper content of ores shipped.

The low grade ores of the Boundary district, in addition to being self fluxing, are remarkably uniform in character, ranging from 1 to 2 per cent in copper and from \$1 to \$2 in gold and silver. In this district the greater part of the production has been obtained from the properties of three of the principal companies: The Granby Consolidated Mining, Smelting, and Power Company, Limited; The British Columbia Copper Company, and the Consolidated Mining and Smelting Company of Canada, Limited. The Dominion Copper Company's properties remained idle throughout the year, pending the reorganization of the Company as the New Dominion Copper Company. This Company has since passed into the control of the British Columbia Copper Company. Each of the three first named companies is operating its own smelter, and the first two convert their matte into blister copper.

The approximate ore shipments during 1909, and the total shipments of the chief producers to the end of 1909, were as follows:—

	1909.	Total.
Granby Consolidated Mining, Smelting, and Power Co., Ltd.....	1,068,000	5,710,000
British Columbia Copper Co.....	350,000	2,005,000
Dominion Copper Co.....	Nil.	595,000
Consolidated Mining and Smelting Co., of Canada, Ltd., (Snowshoe)	161,000	439,000
	1,579,000	8,749,000

The Granby Company's mines at Phoenix are equipped for a daily output of about 5,000 tons. At the Company's smelter at Grand Forks, about 1,070,000 tons of ore were treated during 1909, producing 22,200,000 pounds of copper. Statistics of the smelter production of this firm will be found on pages 28 and 29.

The British Columbia Copper Company, which during the first four months was not operating, shipped during the latter part of the year about 350,000 tons of ore, the greater part of which came from the Mother Lode.

The cost per ton of ore handled, including all charges, from ore in place to sale of the contained metals, was estimated by the Company at \$2.62, or about 10 cents per pound of fine copper after crediting expenditure with gold and silver values.

The Dominion Copper Company's properties were idle all year. The output of the Consolidated Mining and Smelting Company's Snowshoe mine was about 161,000 tons, which went to Trail for treatment.

Next to the Boundary, Rossland is the most important copper producing district. Gold is the chief element of value in this camp, although copper is of considerable importance. The average tenor of the Rossland ores is shown in a table to be found under gold. The total shipments of ore in 1909 are reported as 237,656 tons from Trail Creek mining division, containing 3,509,909 pounds of copper, being an average of 0.750 per cent. The principal operating companies were:—

The Consolidated Mining and Smelting Company of Canada, Limited, operating the Centre Star group, consisting of the Centre Star, War Eagle, Idaho, Iron Mask, and other claims; from which they shipped about 180,409 tons of ore during the year.

The Le Roi Mining Company, Limited, shipped from the Le Roi and Black Bear 11,582 tons. The shipments by the Le Roi No. 2, Limited, were 29,571 tons of ore, and 835 tons of concentrates derived from 15,984 tons of ore milled. From five other mines, some 260 tons were shipped.

In the Coast district, 39,557 tons are credited with a content of 1,160,071 pounds of copper or 1.47 per cent. This ore was derived from the mines of the Tyee Copper Company, the Marble Bay mines of the Tacoma Steel Company, the Northern Texada mines, and the Britannia mines.

On Queen Charlotte islands, the Ikeda mines were operated by Awaya, Ikeda and Company for the first six months of the year; but, towards its close, were bonded to the Ikeda Mines, Limited.

### Yukon District.

There were no shipments from the Whitehorse mines during 1909. High freight rates from Whitehorse to the smelters and inadequate railway facilities from the mines to Whitehorse, have restricted shipments from this camp, although development work seems to have indicated the existence of a considerable tonnage of ore.

The total ore shipments from the camp to the end of 1908 exceeded 4,700 tons. The shipments during 1907 and 1908, reported as railway shipments, are shown hereunder, the shipments to the end of 1906 being those mentioned by R. G. McConnell in his recent report.<sup>1</sup>

<sup>1</sup> Report on Whitehorse Copper Belt, Geological Survey Publication No. 1050.

## Shipments of Copper Ore from Whitehorse, Yukon.

	Total Ship- ments to 1906.	1907.	1908.
	Tons.	Tons.	Tons.
Arctic Chief. ....	140	570·6	32·3
Copper King. ....	500	275·2	360·7
Claude Irvine. ....			14·7
Grafter. ....		1,914·4	
Pueblo. ....	100	530·5	
Valerie. ....	40		
War Eagle. ....		239·4	
	780	3,530·1	407·7



## GOLD.

*Refined Metal.*—Gold bullion is received, assayed, and purchased at the Assay office in Vancouver, operated in connexion with this Department, the bullion being resold to the United States Mint. The total quantity of bullion thus received during the twelve months ending December 31, 1909, was 47,576.27 ounces, being the weight after melting, valued at \$789,267.94 after deducting assay charges, the average fineness of the resulting bullion being 0.802 gold and 0.178 silver. A refinery is being erected at the Royal Mint at Ottawa, but at present the greater part of the Canadian gold finds its way to the United States refineries or to the United States Mint.

There is but one refinery in Canada producing fine gold; that at Trail, established in 1904 and operated by the Consolidated Mining and Smelting Company of Canada, Limited, the annual output of which in ounces of fine gold for the years 1904-9 is shown below. This gold is recovered from the ores treated in the lead furnaces.

### Production of Refined Gold at Trail, B.C.

Year.	Ozs.
1904.....	4,336
1905.....	8,602
1906.....	9,993
1907.....	10,395
1908.....	15,346
1909.....	18,241

*Mine Production.*—The production of gold in Canada, made up of gold derived from alluvial workings, gold obtained from the crushing of free milling quartz ores, and the gold obtained from other metalliferous ores sent to copper and lead smelters, etc., reached a total in 1909 of 453,865 fine ounces valued at \$9,382,230, as compared with 476,112 fine ounces valued at \$9,842,105 produced in 1908, a decrease of 22,247 ounces in quantity and \$459,875 in value, or 4.67 per cent, but an increase of 48,348 ounces over 1907, which was, however, the lowest production for several years.

The production by Provinces in 1907, 1908, and 1909 is shown in Table 1 as follows:—

GOLD.—TABLE 1.

## Production by Provinces, 1907, 1908, and 1909.

	1907.		1908.		1909.	
	Ozs. (fine ‡)	Value.	Ozs. (fine ‡)	Value.	Ozs. (fine ‡)	Value.
		\$		\$		\$
Nova Scotia.....	(b) 13,675	282,686	11,842	244,799	10,193	210,711
Quebec.....					193	3,990
Ontario.....	(b) 3,212	66,399	3,212	66,389	1,569	32,425
Alberta.....	(a) 33	675	50	1,037	25	525
British Columbia..	(c) 236,216	4,883,020	286,858	5,929,880	250,320	5,174,579
Yukon.....	(a) 152,381	3,150,000	174,150	3,600,000	191,565	3,960,000
Totals.....	405,517	8,382,780	476,112	9,842,105	453,865	9,332,230

‡ Calculated from the value: one dollar = 0.048375 ozs.

(a) Placer gold.

(b) Gold from vein mining.

	1907.	1908.	1909.
(c) As follows: gold from placer mining.....	\$828,000	\$647,000	\$477,000
"      vein      "      ....	4,055,020	5,282,880	4,697,579
	\$4,883,020	\$5,929,880	5,174,579

The exact value of fine gold is  $\frac{80.00}{38.7}$  dollars per ounce, equivalent to \$20.671834. (United States Standard).

In most cases, statistics of gold production are stated crude bullion with value thereof. The fine ounces given in the tables in this report are calculated from the values by multiplying these by  $\frac{88.7}{80.00}$  or 0.048375.

Of the total production in 1909 about \$4,437,525 or 47.3 per cent is to be attributed to alluvial workings, \$572,619 or 6.1 per cent derived from stamp milling, and \$4,371,914 or 46.6 per cent obtained from ores sent to the smelters. The decrease for 1909 is due to a general decrease in the production of the several provinces, the Yukon district only, showing an increased output. Statistics of the annual gold production of Canada since 1858 are shown in Table 2.

GOLD.—TABLE 2.

## Annual Production in Canada, 1858-1909.

Calendar Year.	Ozs. (fine.‡)	Value.	Calendar Year.	Ozs. (fine.‡)	Value.
		\$			\$
1858.....	34,104	705,000	1885.....	55,575	1,148,829
1859.....	78,129	1,615,072	1886.....	70,782	1,463,196
1860.....	107,806	2,228,543	1887.....	57,460	1,187,804
1861.....	128,973	2,666,118	1888.....	53,145	1,098,610
1862.....	135,391	2,798,774	1889.....	62,653	1,295,159
1863.....	202,498	4,186,011	1890.....	55,620	1,149,776
1864.....	199,605	4,126,199	1891.....	45,018	930,614
1865.....	192,898	3,987,562	1892.....	43,905	907,601
1866.....	152,555	3,153,597	1893.....	47,243	976,603
1867.....	145,775	3,013,431	1894.....	54,600	1,128,688
1868.....	134,169	2,773,527	1895.....	100,798	2,083,674
1869.....	102,720	2,123,405	1896.....	133,262	2,754,774
1870.....	83,415	1,724,348	1897.....	291,557	6,027,016
1871.....	105,187	2,174,412	1898.....	666,386	13,775,420
1872.....	90,283	1,866,321	1899.....	1,028,529	21,261,584
1873.....	74,346	1,536,871	1900.....	1,350,057	27,908,153
1874.....	97,856	2,022,862	1901.....	1,167,216	24,128,503
1875.....	130,300	2,693,533	1902.....	1,032,161	21,336,667
1876.....	97,729	2,020,233	1903.....	911,559	18,843,590
1877.....	94,304	1,949,441	1904.....	796,374	16,462,517
1878.....	74,420	1,538,394	1905.....	684,951	14,159,195
1879.....	76,547	1,582,358	1906.....	556,415	11,502,120
1880.....	63,121	1,304,824	1907.....	405,517	8,332,780
1881.....	63,524	1,313,153	1908.....	476,112	9,842,105
1882.....	60,288	1,246,268	1909.....	453,865	9,382,230
1883.....	53,853	1,113,246			
1884.....	51,202	1,058,439			
				13,431,758	277,659,133

‡ Calculated from the value: one dollar = 0.048375 ounces.

It will be observed that previous to 1897 the production only twice exceeded \$4,000,000, the maximum output during the period being in 1863, when the output reached \$4,186,011. The discovery in 1896 of the rich placer deposits of the Yukon, however, caused a rapid increase in the production for the next four years, a record maximum being reached in 1900 when the output was only a little less than \$28,000,000. The following year showed a falling off in the Yukon output, as did each succeeding year until 1908. Although the 1909 production is less than that of 1903, it is higher than that of 1907 and it may be that the tide has again turned.

## Nova Scotia.

The gold production of Nova Scotia, which is derived almost entirely from quartz ores, was 10,193 fine ounces valued at \$210,711.

The principal operators in 1909, were:—

The New England Mining Company...Goldboro, N.S.  
 Edgar Silver et.al. (Goldfinch property)...Lower Seal Harbour.  
 Sydney Gold Mining Company.....Country Harbour Narrows.  
 McDonald and Copeland.....Forest Hill.  
 Geo. A. Hirschfield.....Goldenville.  
 Eagle Mining Syndicate.....Salmon River.

M. J. O'Brien	Harrigan Cove, Moose River, and Renfrew.
Dominion Mining Company	Tangier.
Caribou Gold Mines	Caribou.
Canadian Consolidated Mines Company	Moose River.
Oldham Stirling Gold Company	Oldham.
Oldham Mining Company	"
Petpeswick Mining Company	Lake Catcha.
Chester Basin Gold Syndicate	Gold River.
Uniac Mines and Power Company	"
Ophir Gold Mining Company	Brookfield.
Ponhook Mining Company	Molega Barrens.
Eagle Mining Company	Renfrew.
Great Bras d'Or Mining Company	Middle River.

Statistics of the annual production since 1862 are shown in Table 3, and of the tons of ore treated and yield per ton in Table 4. The production of gold by districts during the twelve months ending September 30, 1909, as collected and published by the Provincial Mines Department, is shown in Table 5, while the total production from 1862 to 1909, by districts, according to the same authority, is shown in Table 6.

GOLD.—TABLE 3.

## Nova Scotia:—Annual Production.

Calendar Year.	Ozs. (fine).	Value.	Calendar Year.	Ozs. (fine).	Value.
		\$			\$
1862	6,863	141,871	1887	20,009	413,631
1863	13,180	272,448	1888	21,137	436,939
1864	18,883	390,349	1889	24,673	510,029
1865	24,011	496,357	1890	22,978	474,990
1866	23,776	491,491	1891	21,841	451,503
1867	25,763	532,563	1892	18,865	389,965
1868	19,377	400,555	1893	18,436	381,095
1869	16,855	348,427	1894	18,834	389,338
1870	18,740	387,392	1895	21,919	453,119
1871	18,139	374,972	1896	23,876	493,568
1872	12,352	255,349	1897	27,195	562,165
1873	11,180	231,122	1898	26,054	538,590
1874	8,623	178,244	1899	29,876	617,604
1875	10,576	218,629	1900	28,955	598,553
1876	11,300	233,585	1901	26,459	546,963
1877	15,925	329,205	1902	30,348	627,357
1878	11,864	245,253	1903	25,533	527,806
1879	12,980	268,328	1904	10,362	214,209
1880	12,472	257,823	1905	13,707	283,353
1881	10,147	209,755	1906	12,223	252,676
1882	13,307	275,090	1907	13,675	282,686
1883	14,571	301,207	1908	11,842	244,799
1884	15,168	313,554	1909	10,193	210,711
1885	20,945	432,971			
1886	22,038	455,564			
				868,025	17,943,753



GOLD.—TABLE 4.

## Nova Scotia:—Ore Treated, and Yield of Gold per Ton.

Calendar Year.	Tons Treated.	Yield of Gold per ton.	Calendar Year.	Tons Treated.	Yield of Gold per ton.
1862.....	6,473	\$21.91	1886.....	29,010	\$15.70
1863.....	17,000	16.02	1887.....	32,280	12.81
1864.....	21,431	18.21	1888.....	36,178	12.08
1865.....	24,421	20.32	1889.....	39,160	13.02
1866.....	32,157	15.28	1890.....	42,749	11.11
1867.....	31,384	16.96	1891.....	36,351	12.42
1868.....	32,259	12.41	1892.....	32,552	11.98
1869.....	35,144	19.91	1893.....	42,354	8.99
1870.....	30,824	12.56	1894.....	55,357	7.04
1871.....	30,787	12.17	1895.....	60,600	7.47
1872.....	17,089	14.94	1896.....	69,169	7.13
1873.....	17,708	13.05	1897.....	73,192	7.68
1874.....	13,844	12.87	1898.....	82,747	6.50
1875.....	14,810	14.76	1899.....	112,226	5.50
1876.....	15,490	15.08	1900.....	87,390	6.85
1877.....	17,369	18.95	1901.....	91,948	5.32
1878.....	17,989	13.63	1902.....	93,842	6.68
1879.....	15,936	16.83	1903.....	103,856	5.08
1880.....	13,997	18.42	1904.....	45,436	4.71
1881.....	16,556	12.66	1905.....	57,774	4.90
1882.....	21,081	13.04	1906.....	66,059	3.82
1883.....	25,954	11.60	1907.....	58,550	4.82
1884.....	25,186	12.44	1908.....	61,536	3.97
1885.....	28,890	14.98	1909.....	56,790	3.71

GOLD.—TABLE 5.

## Nova Scotia:—District Details, Year ending September 30, 1909.

District.	Tons Crushed.	Total Yield of Gold.			Average Yield per ton.		
		Ozs.	Dwts.	Grs.	Ozs.	Dwts.	Grs.
Stormont.....	42,617	6,185	15	0	.....	2	21
Wagamatcook.....	1,783	708	0	0	.....	7	22
Caribou.....	1,055	284	6	0	.....	5	9
Caribou (Moose River).....	9,479	1,079	6	0	.....	2	7
Uniacke.....	90	41	17	23	.....	9	7
Gold River.....	891	401	4	0	.....	9	0
Tangier.....	180	63	0	0	.....	7	0
Oldham.....	1,373	3,017	14	0	2	3	23
Brookfield.....	155	24	0	16	.....	3	2
Ecum Secum.....	30	4	13	0	.....	3	2
Molega Barrens.....	1,021	615	14	5	.....	12	1
Montague.....	(Mortared)	1	15	15	.....	.....	.....
Renfrew.....	180	45	0	0	.....	5	0
Salmon River.....	143	97	0	0	.....	13	13
Sherbrooke.....	61	28	6	2	.....	9	7
Total.....	59,058	12,597	12	13	.....	4	6

GOLD.—TABLE 6.

## Nova Scotia:—Production of Gold from 1862 to 1909.

District.	Tons Crushed.	Total Yield of Gold.			Average Yield of Gold.			Value at \$19 per oz.
		Ozs.	Dwts.	Grs.	Ozs.	Dwts.	Grs.	
*Caribou and Moose River..	213,542	57,279	8	22	.....	5	9	1,088,310
Montague.....	29,178	41,987	15	5	.....	1	8	797,767
Oldham.....	56,410	54,000	12	21	.....	1	2	1,216,012
Renfrew.....	53,084	45,174	7	19	.....	.....	1	858,313
Sherbrooke.....	299,992	153,002	1	4	.....	10	5	2,907,039
Stormont.....	478,263	113,053	.....	17	.....	4	18	2,148,008
Tangier.....	51,945	24,447	11	19	.....	9	10	464,504
†Uniacke.....	63,269	43,946	1	17	.....	13	21	834,976
Waverley.....	155,520	69,980	10	16	.....	9	.....	1,329,630
Brookfield.....	93,437	38,685	19	14	.....	8	7	735,034
‡Salmon River.....	118,583	41,796	10	20	.....	7	1	794,135
Whiteburn.....	6,907	9,800	.....	2	.....	1	8	186,200
\$Lake Catcha.....	27,202	26,986	5	23	.....	19	20	512,739
*Rawdon.....	12,189	9,606	5	10	.....	15	18	182,519
Wine Harbour.....	77,396	34,992	15	11	.....	9	1	664,863
Fifteenmile Stream.....	36,456	17,058	15	5	.....	9	8	324,117
Malaga.....	21,917	19,909	5	12	.....	18	4	378,276
Other districts.....	141,233	74,139	13	2	.....	10	12	1,408,653
	1,936,523	885,847	1	23	.....	9	4	16,831,095
Not included in above ;								
gold extracted from 1905	527	1,232	16	23	.....	2	6	23,424
or contained in stib- 1906	783	1,031	13	11	.....	1	6	19,602
nite oreshipped from 1907	1,403	1,319	18	12	.....	18	19	25,078
West Gore, as per 1908	133	179	5	0	.....	1	6	3,406
returns..... 1909					.....			
Total.....	1,939,369	889,610	15	21	.....	.....	.....	16,902,605

\*From 1869. †From 1866. ‡From 1883. ||From 1887. §From 1882. ¶From 1887.  
 |||From 1883.

The following notes with respect to operations during 1909 at the principal mines are taken from the report of the Provincial Department of Mines.

*New England Mining Company*, operating at Goldboro, Guysboro county.

During the year ending Sept. 30, 41,425 tons of ore crushed yielded 5,024 ounces of gold valued at \$95,456, this recovery being 82.6 per cent by stamp amalgamation and 17.4 per cent by bromo cyanide extraction from 1,171.5 tons of concentrates, and being a total yield of \$2.30 from each ton of ore crushed. Compared with the previous year the production shows an increase of 3,425 tons crushed, 938 ounces of gold recovered, and 24 cents a ton yield.

*Consolidated Mines Company of Canada, Limited*, Moose River, Halifax county.

From 6,344 tons of ore crushed 539 ounces of gold were recovered.

*Oldham Sterling Gold Company*, Oldham, Halifax county.

From 940 tons of ore mined and crushed 2,710 ounces of gold were recovered, being an average recovery of 2.88 ounces from each ton of ore crushed. Compared with the production for the year ending September 30, 1908, this produc-

tion shows an increase of 414 tons crushed, 326 ounces of gold recovered, and a decrease of 1.65 ounces in the yield per ton.

*Great Bras d'Or Gold Mining Company*, Middle River, Victoria county.

From 1,783 tons of ore mined and crushed, 708 ounces of gold were recovered.

### Quebec.

The production of gold reported from this Province since 1903 has been almost entirely from the pyritous ores mined at Capelton and Eustis in the Eastern Townships. Very little gold has been obtained from the alluvial deposits of the St. Francis, Chaudière, and Gilbert rivers since 1894, when the output was returned as \$29,106.

GOLD.—TABLE 7.

### Quebec:—Annual Production.

Calendar Year.	Ozs. (fine*)	Value.	Calendar Year.	Ozs. (fine*)	Value.
		\$			\$
1877.....	583	12,057	1894.....	1,412	29,106
1878.....	868	17,937	1895.....	62	1,281
1879.....	1,160	23,972	1896.....	145	3,000
1880.....	1,605	33,174	1897.....	44	900
1881.....	2,741	56,661	1898.....	295	6,089
1882.....	827	17,093	1899.....	238	4,916
1883.....	860	17,787	1900.....	Nil	Nil
1884.....	422	8,720	1901.....	145	3,000
1885.....	103	2,120	1902.....	391	8,073
1886.....	193	3,981	1903.....	180	3,712
1887.....	78	1,604	1904.....	140	2,900
1888.....	181	3,740	1905.....	191	3,940
1889.....	58	1,207	1906.....	165	3,412
1890.....	65	1,350	1907.....	Nil	Nil
1891.....	87	1,800	1908.....	Nil	Nil
1892.....	628	12,987	1909.....	193	3,990
1893.....	759	15,696			
				14,819	306,295

\*Calculated from the value: one dollar=0.048375 ozs.

### Ontario.

The chief producers in 1909 were:—

The Imperial Gold Mines, Limited, operating the Laurentian mine near Gold Reck.

The Big Dipper Mining and Milling Company, Big Dipper mine, Barrie township, Frontenac county.

The Larder Lake district has not as yet become a producer of bullion. The new gold district of Porcupine, situated in the townships of Whitney and Tisdale near Porcupine lake, attracted considerable attention towards the close of the year owing to the discovery of large outcroppings of quartz with spectacular showings of gold.

Statistics of production of gold in Ontario since 1887 are shown in Table 8, following:—

GOLD.—TABLE 8.  
Ontario:—Annual Production.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		\$			\$
1887.....	327	6,760	1900.....	14,391	297,395
1888.....	Nil.	Nil.	1901.....	11,844	244,837
1889.....	"	"	1902.....	11,118	229,828
1890.....	"	"	1903.....	9,076	188,036
1891.....	97	2,000	1904.....	1,935	40,000
1892.....	344	7,118	1905.....	4,402	91,000
1893.....	708	14,637	1906.....	3,202	66,193
1894.....	1,917	39,624	1907.....	3,212	66,399
1895.....	3,015	62,320	1908.....	3,212	66,389
1896.....	5,563	115,000	1909.....	1,569	32,425
1897.....	9,157	189,294			
1898.....	12,863	265,889			
1899.....	20,394	421,591		118,366	2,446,835

\* Calculated from the value : one dollar=0·048375 ozs.

### Alberta.

The value of gold derived from the placer deposits of the Saskatchewan river and purchased by banks at Edmonton, was in 1908 about \$1,037, and in 1909, \$525. This is the only record of production during these years.

Statistics of the production of gold from the Saskatchewan river since 1887 are shown in Table 9.

GOLD.—TABLE 9.  
Alberta:—Annual Production.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		\$			\$
1887.....	102	2,100	1900.....	242	5,000
1888.....	58	1,200	1901.....	726	15,000
1889.....	967	20,000	1902.....	484	10,000
1890.....	193	4,000	1903.....	48	1,000
1891.....	266	5,500	1904.....	24	500
1892.....	508	10,506	1905.....	121	2,500
1893.....	466	9,640	1906.....	39	800
1894.....	726	15,000	1907.....	33	675
1895.....	2,419	50,000	1908.....	50	1,037
1896.....	2,661	55,000	1909.....	25	525
1897.....	2,419	50,000			
1898.....	1,209	25,000		14,512	299,983
1899.....	726	15,000			

\* Calculated from the value : one dollar=0·048375 ozs.



## British Columbia.

The gold production of British Columbia in 1909, as reported to the Department, amounted to \$5,174,579, comprising placer gold, \$477,000; bullion from milling ores, \$329,655; smelter recoveries, \$4,367,924. The placer production is as published by the Provincial Mining Bureau. The statistics for lode gold represent as closely as could be ascertained the actual gold recovery, based on smelter recoveries and bullion shipments. This production is slightly less than that published by the Provincial Bureau of Mines, which for lode gold is based on gold content of ores shipped to smelters, etc. According to this authority the production for 1909 was \$5,401,090, as compared with \$5,929,880 in 1908, a decrease of \$528,790 or 11.2 per cent.

The greatest decrease was in the Rossland camp, largely due to the fact that the Le Roi mine, formerly the premier mine of the camp, was closed down for nearly half the year. With the exception of the lode mining in Nelson, Grand Forks, and the Coast divisions, there was an almost universal decrease in the gold production for the year.

Of the 1909 production 9.2 per cent was from alluvial workings, 6.4 per cent from free milling ores, and 84.4 per cent from ores sent to the smelters.

Statistics of the production by districts in 1909, as published by the Provincial Department of Mines, are given in Table 10, while the total annual production since 1858 is given in Table 11.

GOLD.—TABLE 10.

British Columbia:—Products by Districts, 1909.<sup>1</sup>

Districts.	Gold : Placer.		Gold : Lode.	
	Ozs.	Value.	Ozs.	Value.
		\$		\$
Cariboo :—				
Cariboo .....	11,000	220,000		
Quesnel .....	600	12,000		
Omineca .....	750	15,000		
Cassiar :—				
Atlin :—	10,000	200,000		
All other divisions.....	450	9,000	261	5,395
East Kootenay :—				
Fort Steele.....	150	3,000		
Other divisions.....				
West Kootenay :—				
Ainsworth.....			162	3,349
Nelson .....	50	1,000	21,909	452,859
Slocan and Slocan City.....			95	1,964
Trail Creek.....			115,153	2,380,213
All other divisions.....	100	2,000	732	15,130
Lillooet.....	500	10,000	323	6,676
Yale :—				
Grand Forks .....	50	1,000	93,229	1,927,043
Similkameen, etc.....	50	1,000		
Yale, etc.....	100	2,000		
Coast, and all other divisions .....	50	1,000	6,360	131,461
Totals.....	23,850	477,000	238,224	4,924,090

<sup>1</sup> From the Annual Report of the Minister of Mines, for British Columbia.

## GOLD.—TABLE 11.

## British Columbia:—Annual Production.

Calendar Year.	Ozs. (fine†).	Value.	Calendar Year.	Ozs. (fine†).	Value.
		\$			\$
1858	34,104	705,000	1885	34,527	713,738
1859	78,129	1,615,072	1886	43,714	903,651
1860	107,806	2,228,543	1887	33,558	693,709
1861	128,973	2,666,118	1888	29,834	616,731
1862	128,528	2,656,903	1889	28,489	588,923
1863	189,318	3,913,563	1890	23,918	494,436
1864	180,722	3,735,850	1891	20,792	429,811
1865	168,887	3,491,205	1892	19,327	399,525
1866	128,779	2,662,106	1893	18,360	379,535
1867	120,012	2,480,868	1894	25,664	530,530
1868	114,792	2,372,972	1895	61,289	1,266,954
1869	85,865	1,774,978	1896	86,504	1,788,206
1870	64,675	1,336,956	1897	131,805	2,724,657
1871	87,048	1,799,440	1898	142,215	2,939,852
1872	77,931	1,610,972	1899	203,295	4,202,473
1873	63,166	1,305,749	1900	228,916	4,732,105
1874	89,233	1,844,618	1901	257,292	5,318,703
1875	119,724	2,474,904	1902	288,383	5,961,409
1876	86,429	1,786,648	1903	284,108	5,873,036
1877	77,796	1,608,182	1904	275,975	5,704,908
1878	61,688	1,275,204	1905	285,529	5,902,402
1879	62,407	1,290,058	1906	269,886	5,579,039
1880	49,044	1,013,827	1907	236,216	4,883,020
1881	50,636	1,046,737	1908	286,858	5,929,880
1882	46,154	954,085	1909	250,320	5,174,579
1883	38,422	794,252			
1884	35,612	736,165			
				6,042,654	124,912,787

† Calculated from the value : one dollar = 0·048375 ozs.

The placer and hydraulic mining situation shows little change from 1908. There was a slight decrease in production in the Atlin district, from \$203,000 to \$200,000, but the producers were practically the same as in 1908, two of the most important operators, the Atlin Consolidated Mining Company and the Pine Creek Power Company, not producing.

In the Stikine division, the Berry Creek Company was idle. The Cariboo division fell off nearly 30 per cent in its production.

Two or three large hydraulic companies were busy with construction work, and are not likely to become producers before 1911.

Of the lode gold production, 48·3 per cent was derived from Rossland camp in 1909, as compared with 55·7 per cent in 1908. The principal companies carrying on active operations during 1909 were as follows:—

The Consolidated Mining and Smelting Company of Canada, Limited, with total shipments of 180,409 tons.

The Le Roi Mining Company, Limited, shipping 11,582 tons.

The Le Roi No. 2, Limited, shipping 29,571 tons of first-class ore and 835 tons of concentrates, which were produced from the milling of 15,984 tons of second-class ore.

Several of the smaller properties of the camp also shipped during the year.

The following table shows the production of the Rossland mines since 1894, and illustrates the average results attained during each of the past sixteen years.

**Ore Shipments, total metallic content, and average metallic content per ton from Rossland mines, as determined from smelter returns.<sup>1</sup>**

Year.	Ore, tons, 2,000 lbs.	Gold.		Silver.		Copper.		Total.	Value Per ton.
		Ozs.	Ozs. Per ton.	Ozs.	Ozs. Per ton.	Lbs.	Per cent		
1894.....	1,856	3,723	2·000	5,357	2·890	106,229	2·850	75,510	40 69
1895.....	19,693	31,497	1·600	46,702	2·410	840,420	2·100	702,459	35 67
1896.....	38,075	55,275	1·450	89,285	2·340	1,580,635	2·080	1,243,360	32 65
1897.....	68,804	97,024	1·420	110,068	1·600	1,819,586	1·320	2,097,280	30 48
1898.....	111,282	87,343	0·780	170,804	1·540	5,232,011	2·350	2,470,811	22 10
1899.....	172,665	102,976	0·596	185,818	1·070	5,693,889	1·650	3,229,086	18 70
1900.....	217,636	111,625	0·513	167,378	0·769	2,071,865	0·476	2,739,300	12 58
1901.....	283,360	132,333	0·467	970,460	3·424	8,333,446	1·470	4,621,299	16 31
1902.....	329,534	162,146	0·492	373,101	1·132	11,667,807	1·770	4,893,395	14 85
1903.....	360,786	145,353	0·403	209,537	0·581	8,652,127	1·199	4,255,958	11 80
1904.....	312,991	133,095	0·425	181,830	0·581	7,119,876	1·137	3,760,866	12 01
1905.....	330,618	129,843	0·393	147,753	0·447	5,800,294	0·877	3,672,828	11 11
1906.....	279,527	105,356	0·377	126,174	0·451	4,750,110	0·850	3,173,587	11 35
1907.....	285,923	94,573	0·331	126,661	0·443	5,080,275	0·888	3,049,485	10 67
1908.....	302,419	142,314	0·471	129,558	0·428	5,042,244	0·834	3,672,270	12 14
1909.....	237,656	115,653	0·487	80,026	0·336	3,509,909	0·750	2,874,956	12 10

<sup>1</sup> From the Annual Report of the Minister of Mines for British Columbia.

The Boundary district comes next in gold production and is credited with \$1,927,043 in 1909, an increase of nearly 2 per cent over 1908. The output is mainly due to the small gold content of the large tonnage of copper ores mined in this district. These ores will average in gold, only from 0·04 to 0·05 ounces per ton, but nearly 1,500,000 tons were mined in 1909. Included in this district is the Osoyoos Mining division, in which is situated the Nickel Plate mine at Hedley. This property and its mill are now being operated by the Hedley Gold Mining Company, and the New Daly Reduction Company. Extensive alterations have been made to their 40 stamp mill, including the installation of a slimes process involving regrinding and filterpressing.

Nelson Mining division has had a season of prosperity and witnessed extensive development in the Sheep Creek camp, where the ore is treated in stamp mills, producing bullion and concentrates. The production reached nearly half a million in gold in 1909 and the proven ore-bearing area is being steadily widened. The chief producing mines of the year were the Nugget, Yankee Girl, Mother Lode, and Kootenay Belle in the Sheep Creek camp; while in other parts of the district the Silver King, Granite-Poorman, and Arlington show increases in their production. There was also an increased gold production in the Coast district due to a renewal of mining on Texada island.

### Yukon.

The production of the Yukon in 1909 was \$3,960,000, as compared with \$3,600,000 in 1908, an increase of \$360,000 or 10 per cent. The statistics of the

production of gold in the Yukon district during the years between 1898 and 1906, as given in Table 14, are based primarily on the receipts of gold at the United States mints and receiving offices and credited to the Canadian Yukon. Although a royalty was exacted on the gold output, it seems certain that, particularly during the years of high production, considerable amounts of gold were produced which escaped royalty payment. During the past three years, however, the gold production of the Yukon, as ascertained by the Interior Department, and on which a royalty of  $2\frac{1}{2}$  per cent is imposed, has agreed fairly closely with the quantities reported at the United States receiving offices as having been derived from the Canadian Yukon. For the purpose of collecting the royalty, a fixed value of \$15 per ounce is placed upon the crude gold. The actual value of the gold will average somewhat higher than this, however. The average value of the deposits for a number of years, as shown by the experience of the United States assay offices, has been about \$16.50 per ounce. At the Canadian assay office at Vancouver, B.C., there was deposited during the twelve months ending December 31, 1909, 5,003.12 ounces from the Yukon, valued, after all charges had been deducted, at \$83,870.84, showing an average value of \$16.75 per ounce.

The production of crude gold in the Yukon during the past four years, as ascertained by the Department of the Interior, and upon which a royalty of  $2\frac{1}{2}$  per cent has been collected, is shown in the accompanying Table.

#### Production of Crude Gold in the Yukon District.

Month.	1906.	1907.	1908.	1909.
	Ozs.	Ozs.	Ozs.	Ozs.
January. ....	3,732.94	7,308.95	2,464.00	69.50
February.....	11,693.99	213.00	47.30	115.33
March.....	10.30	66.80	16.65	848.39
April.....	784.77	202.80	947.00	3.75
May.....	64,060.66	35,736.62	6,851.96	117.33
June.....	57,578.27	31,402.14	51,530.90	62,254.92
July.....	49,012.36	26,793.50	35,291.11	52,123.43
August.....	54,947.07	22,392.10	37,930.99	47,440.83
September.....	53,487.08	33,119.51	39,654.27	44,466.20
October.....	51,799.53	35,589.70	37,028.93	26,572.23
November.....	131.81	200.30	1,989.39	4,853.69
December.....	3,352.83	52.80	5,491.76	892.75
	350,391.61	193,078.22	219,244.31	239,766.35

In 1909 the production is estimated at \$3,960,000 in gold, representing 191,565 fine ounces of metal and 45,000 fine ounces of silver valued at \$23,176, being at the average price for fine silver for the year, making a total valuation of the Yukon output of \$3,983,176. In 1908 the production was estimated at \$3,600,000, representing 174,150 fine ounces of metal and 41,000 fine ounces of silver valued at \$21,674, making a total valuation of \$3,621,674.

Statistics of the annual production of gold in the district since 1885 are shown in Table 12.



## GOLD.--TABLE 12.

## Annual Production in Yukon.

Calendar Year.	Ozs. (fine‡).	Value.	Calendar Year.	Ozs. (fine‡).	Value.
		\$			\$
1885)			1899 .....	774,000	16,000,000
1886)	4,387	100,000	1900 .....	1,077,553	22,275,000
1887 .....	3,386	70,000	1901 .....	870,750	18,000,000
1888 .....	1,935	40,000	1902 .....	701,437	14,500,000
1889 .....	8,466	175,000	1903 .....	592,594	12,250,000
1890 .....	8,466	175,000	1904 .....	407,938	10,500,000
1891 .....	1,935	40,000	1905 .....	381,001	7,876,000
1892 .....	4,233	87,500	1906 .....	270,900	5,600,000
1893 .....	8,514	176,000	1907 .....	152,381	3,150,000
1894 .....	6,047	125,000	1908 .....	174,150	3,600,000
1895 .....	12,094	250,000	1909 .....	191,565	3,960,000
1896 .....	14,513	300,000			
1897 .....	120,937	2,500,000		6,373,382	131,749,500
1898 .....	483,750	10,000,000			

‡ Calculated from the value: one dollar=0.048375 ozs.

Since 1898, a royalty to the extent of \$3,696,894 has been collected on the gold production of this district. The yearly amounts collected, as well as the annual production of gold as ascertained by the Interior Department, are shown in the accompanying table. The difference between these figures and those shown in Table 14, which are based on the Mint receipts of Yukon gold, has already been mentioned and is probably due to two main factors: (1) the fixing of the value of the gold for royalty purposes at \$15 per ounce, a figure from \$1 to \$2 less than the actual value of the gold, and (2) the probability that in the earlier years of royalty collection considerable quantities of gold dust left the camp unrecorded and escaped royalty payment.

Gold Production in the Yukon, and Royalty Collected.<sup>1</sup>

Fiscal Year.	Total Gold Production.	Total Exemption.	Royalty Collected on.	Royalty Paid.
	\$	\$	\$	\$
1898 .....	3,072,773	339,845	2,732,928	273,292
1899 .....	7,582,283	1,699,657	5,882,626	588,262
1900 .....	9,809,464	2,501,744	7,307,720	730,771
1901 .....	9,162,082	1,927,666	7,236,522	592,660
1902 .....	9,566,340	1,199,114	8,367,225	331,436
1903 .....	12,113,015	.....	12,113,015	302,893
1904 .....	10,790,663	.....	10,790,663	272,217
1905 .....	8,222,054	.....	8,222,054	206,760
1906 .....	6,540,007	.....	6,540,007	163,963
1907 (9 months) .....	3,304,791	.....	3,304,791	82,622
1908 .....	2,820,162	.....	2,820,162	70,505
1909 .....	3,260,282	.....	3,260,282	81,507

‡ From the Report of the Mines Branch of the Department of the Interior, 1909.

## IRON AND STEEL.

### INTRODUCTORY.

The iron and steel industry in Canada in 1909 shows a very satisfactory and steady growth as compared with previous years.

There was a larger production of iron ore than in 1908; an increased output of pig iron from Canadian blast furnaces and a larger production of steel ingots and castings; while the imports of pig iron and of iron and steel goods more or less highly manufactured were greatly diminished.

Although iron ores are of wide occurrence throughout Canada, being found practically in every province, the development of these resources has not kept pace with the growth of our iron metallurgical industries.

About 17 per cent only of the iron ore used in Canadian furnaces during 1909 was of domestic origin. Much of the coke and limestone was also imported, so that our iron industries are now, and have been for a number of years, largely dependent on imported raw materials.

The total production of iron ore in Canada to the end of 1909 has probably only slightly exceeded 5,000,000 tons, while our present rate of production varies from 300,000 to 400,000 tons per annum.

There were shipped from Newfoundland in 1909 about 1,110,049 tons of ore, of which about 697,068 tons were sent to Canada for use at Sydney. Since 1896, or during the past fourteen years, we have imported 7,521,086 tons of iron ore, chiefly from Newfoundland and the south shore of Lake Superior. As against this we have exported during the same period about 1,556,996 tons, chiefly to the United States.

Developments are in progress, however, which may in the near future furnish a much larger supply of domestic ore. Active operations are in progress at Torbrook, N.S., and extensive preparations being made to ship from the large magnetite deposits near Bathurst, N.B. The Moose Mountain mine, north of Sudbury, of which much has been expected, shipped an important tonnage during 1909, and development work is being continued. Operations have been started on a deposit twenty-four miles east of Port Arthur, the first in this district, and some initial shipments made. A magnetometric survey was made of the old Bristol mine, Pontiac county, Quebec, by an officer of the Mines Branch, resulting in the discovery of the probable existence of a considerable ore body apparently not previously known.

The production of pig iron and steel is still confined to the eastern half of Canada, chiefly in the Provinces of Ontario and Nova Scotia. There are sixteen

completed blast furnaces, with a total daily capacity of about 2,735 tons. Of the sixteen, twelve have a daily capacity of 100 tons or over. The production of pig iron and steel in 1909 was the highest year's production yet turned out by Canadian furnaces. The bounty which has been paid on iron and steel production ceases at the end of 1910, although provision is still made for the payment of bounty on pig iron produced by electric process to the end of 1912.

The difficulties which had arisen between the Dominion Coal Company and the Dominion Iron and Steel Company, respecting the supply of coal to the latter, and which had to a considerable extent interfered with the Steel Company's output, were satisfactorily settled in the early part of the year, enabling the Steel Company to bring its production again up to normal and provide extensions of its plant, which will include an additional furnace, new coke ovens, and a finishing mill. Towards the close of the year, negotiations were in progress looking to the amalgamation of the two companies, which have since been successfully concluded. A new steel plant was being built at Londonderry, while various additions and extensions to plants were being made in Ontario.

The Algoma Steel Company has made arrangements for the construction of an additional blast furnace of 400 tons capacity, and the erection of a merchant mill for the manufacture of structural steel. Arrangements were also being made for the construction of by-product coke ovens sufficient to supply the steel plant with all the coke it will need.

A summary of the chief statistics of the production of iron ore, pig iron and steel is given hereunder, while many details will be found in subsequent pages.

#### Statistical Summary of Iron Ore, and Iron and Steel Production, 1907-8-9.

Material.	1907.	1908.	1909.
	Short Tons.	Short Tons.	Short Tons.
Iron ore shipped . . . . .	312,856	238,082	268,043
Canadian iron ore charged to furnaces . . . . .	244,104	209,266	257,502
Imported . . . . .	1,117,260	1,051,445	1,235,000
Pig iron made . . . . .	651,962	630,835	757,162
Steel ingots and castings made . . . . .	706,982	588,763	754,719
Finished rolled iron and steel products made (a) . . . . .	672,200	566,099	.....
Canadian coke charged to iron furnaces . . . . .	521,068	492,076	412,016
Imported . . . . .	327,082	325,670	507,255
Pig iron imported . . . . .	(b) 150,157	(c) 212,290	(c) 58,591
Iron and steel goods imported . . . . .	(b) 632,868	(c) 866,710	(c) 487,003

(a) Statistics collected and published by American Iron and Steel Association.

(b) Nine months ending March, 1907.

(c) Twelve months ending March.

{ The figures given do not show the total quantities of iron and steel goods imported, as in many cases the quantities are not given in the trade returns.

## IRON ORE.

The total shipments of iron ore from mines in Canada in 1909 were 268,043 tons, valued at \$659,316 at the shipping point; as compared with 238,082 tons, valued at \$568,189, in 1908, and 312,856 tons, valued at \$666,941, in 1907. By provinces, the production during the past three years was as follows:—

IRON.—TABLE 1.  
Production of Iron Ore by Provinces, 1907-8-9.

Provinces.	1907.		1908.		1909.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
Nova Scotia.....	89,839	137,161	11,802	17,620		
Quebec .....	12,748	34,956	10,103	22,094	4,150	5,508
Ontario.....	207,769	488,324	216,177	528,475	263,893	653,808
British Columbia..	2,500	6,500				
	312,856	666,941	238,082	568,189	268,043	659,316

The production during 1908 and 1909, classified as magnetite, hematites (including brown ores), carbonates, and bog ores, was as follows:—

IRON.—TABLE 2.  
Classified Production of Iron Ore, 1908-9.

Character of Ore.	1908.			1909.		
	Short Tons.	Value.	Per Ton.	Short Tons.	Value.	Per Ton.
		\$	\$ cts.		\$	\$ cts.
Magnetite.....	49,946	124,534	2 49	74,240	162,280	2 19
Hematite.....	173,164	416,127	2 40	190,473	492,348	2 58
Carbonate.....	4,869	5,434	1 12			
Bog.....	10,103	22,094	2 19	3,330	4,688	1 41
	238,082	568,189	2 39	268,043	659,316	2 46



A record of the production of iron ore in past years is shown in Tables 3 and 4:—

IRON.—TABLE 3.

## Production of Iron Ore by Provinces, 1886-1909.

Calendar Year.	Nova Scotia.	Quebec.	Ontario.	British Columbia.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.
1886 .....	44,388	.....	16,032	3,941	64,361
1887 .....	43,532	13,404	16,598	2,796	76,330
1888 .....	42,611	10,710	16,894	8,372	78,587
1889 .....	54,161	14,533	.....	15,487	84,181
1890 .....	49,206	22,305	.....	.....	76,511
1891 .....	53,649	14,380	.....	950	68,979
1892 .....	78,258	22,690	.....	2,300	103,248
1893 .....	102,201	22,076	.....	1,325	125,602
1894 .....	89,379	19,492	.....	1,120	109,991
1895 .....	83,792	17,783	.....	1,222	102,797
1896 .....	58,810	17,630	15,270	196	91,906
1897 .....	23,400	22,436	2,770	2,099	50,705
1898 .....	19,079	17,873	21,111	280	58,343
1899 .....	28,000	19,420	25,126	2,071	74,617
1900 .....	18,940	19,000	82,950	1,110	122,000
1901 .....	18,619	15,489	272,538	7,000	313,646
1902 .....	16,172	18,524	359,288	10,019	404,003
1903 .....	40,335	12,035	209,634	2,290	264,294
1904 .....	61,293	16,152	141,601	.....	219,046
1905 .....	84,952	12,681	193,464	.....	291,097
1906 .....	97,820	9,933	141,078	.....	248,831
1907 .....	89,839	12,748	207,769	2,500	312,856
1908 .....	11,802	10,103	216,177	.....	238,082
1909 .....	.....	4,150	263,893	.....	268,043

IRON.—TABLE 4.

## Production of Iron Ore in Nova Scotia, 1876-1885.

Calendar Year.	Tons.	Calendar Year.	Tons.
1876 .....	15,274	1881 .....	39,843
1877 .....	16,879	1882 .....	42,135
1878 .....	36,600	1883 .....	52,410
1879 .....	29,889	1884 .....	54,885
1880 .....	51,193	1885 .....	48,129

*Nova Scotia.*—No iron ore is reported as shipped from mines in this Province during 1909. The furnaces at Sydney and North Sydney received their supplies of ore from Newfoundland chiefly, while the Londonderry furnace, which is usually run on local ores, was out of commission throughout the year.

The Canada Iron Corporation, Limited, continued to develop their properties at Torbrook, and a quantity of ore was taken out, although none was shipped.

A railway spur is being built from the mines to connect with the Halifax and Southwestern Railway track at Nictaux, and ore shipments are to be made from Port Wade, at which place large ore pockets are to be constructed. The same Company has acquired the iron deposits at Austin brook, near Bathurst, New Brunswick. A railway has been constructed connecting the ore deposits with the Intercolonial railway and shipping piers built at Newcastle.

*Quebec.*—The production of bog ores in this Province is growing less year by year. During 1909, only 3,330 tons were shipped to furnaces, in addition to which a small tonnage of iron sands was shipped for experimental purposes.

A magnetometric survey was made of the Bristol mine, Pontiac county, by Mr. E. Lindeman of the Mines Branch, and a special bulletin has been published giving the results thereof. No shipments have been made from this mine since 1897, but between 1889 and 1897, inclusive, according to returns made to this Department, the mine shipped 29,815 tons. Mr. Lindeman sums up the results of his investigations as follows:—

‘The magnetite occurs in parallel beds and lenticular-shaped bodies along the stratification of hornblendic and micaceous schists. The association of the magnetite and these gangue minerals seems to be very intimate; and in places, complete gradations exist between masses of magnetite and these rocks. Numerous intrusions of granite in the iron-bearing strata seem also to have had an important bearing on the horizontal extent of the deposits as well as on their depth, cutting them into irregular masses, and rendering their extent in depth uncertain. To judge from the irregular magnetic curves, and the numerous exposures of granite, this state of affairs seems to exist round Shaft No. 1.

‘It is manifest that the unprofitable mining operations carried on some years ago were largely due to the irregularities of these ore bodies; to primitive methods of working; and to the long railway haul from the mine to Pennsylvania, U.S.A., where the ore is reported to have been shipped.

‘On the other hand, the present investigation indicates that lot 22, and the east part of lot 21, contain some promising deposits. The most important of these is that on lot 22; the approximate area of which has been estimated at 90,000 square feet. As this deposit is practically all covered by a heavy loam, and taking into consideration the intimate association of the magnetite with the schistose rocks in other parts of the field, it is evident that no definite statement can be made with regard to the tonnage of iron ore in this deposit; but as far as it is now possible to judge from the strong, even, magnetic attraction, there is every reason to conclude that the deposit is of considerable magnitude. In order to ascertain the precise character and quantity of these ore reserves, systematic development in the form of diamond drilling will be necessary.’

*Ontario.*—This Province shows a considerably increased tonnage in iron ore shipments in 1909, due chiefly to a larger output from the Helen mine. There were five shipping mines, as compared with four during 1908.

No shipments were made by the Wilbur, in Lanark county, but the Atikokan mines, west of Port Arthur, were reopened; while the Dominion Bessemer

Ore Company, of Philadelphia, opened up an iron property about twenty-three miles east of Port Arthur, on Thunder bay, and shipped a quantity of ore in two grades, No. 1 running 52 per cent iron, and No. 2, 40 per cent. It is intended to equip the property with crushers and jigs, in order to prepare the ore for market and raise the percentage of metallic iron content.

From the Helen mine at Michipicoten, shipments were made to Hamilton and Sault Ste. Marie, exclusively, no ore being sent to the United States during 1909. The plant at the mine is now entirely electrically driven, taking about 400 horse-power. The Moose Mountain mine, in Hutton township, shipped chiefly to the United States, although one shipment each was made respectively to Sydney, N.S. and Hamilton, Ont. Shipments were also made from the Mayo mine in Hastings county, operated by the Canada Iron Corporation, Limited, under lease, the ore being shipped to Midland and Radnor.

Following is a list of the principal producers of iron ore:—

Canada Iron Corporation, Limited, Mark Fisher Bldg., Montreal.

E. H. Duval, Lévis, Que. (Guay P.O.).

H. C. Bosse, 92 St. Peter street, Quebec, Que.

Dominion Bessemer Ore Company, Limited, 472 Bullitt Bldg., Philadelphia, Pa.

The Lake Superior Power Company, Sault Ste. Marie, Ont.

Atikokan Iron Company, Limited, Port Arthur, Ont.

Moose Mountain Limited, Sellwood, Ont.

#### IMPORTS AND EXPORTS.

During the past fourteen years the iron smelting industry in Canada has had to draw more and more upon imported supplies of iron ore, a large portion of these supplies being, however, derived from Newfoundland, which should hardly be looked upon as a foreign source, though for purposes of commerce it has to be so considered.

The total consumption of iron ore in Canadian furnaces in 1909 was 1,492,502 short tons, made up of 257,502 tons of Canadian ore and 1,235,000 tons of imported ore. The Canadian production was, therefore, only about 17 per cent of our requirements. Previous to 1896 the furnaces were supplied altogether by Canadian ores. The quantities of Canadian and imported ores annually charged to blast furnaces since 1887 are shown in Table 1C. The Department of Customs does not separately publish statistics of iron ore imports.

Since the opening of the Helen mine at Michipicoten, and more recently the Moose Mountain mine in Hutton township, considerable quantities of iron ore have been exported to the United States. The statistics of exports for both calendar and fiscal years are shown in the two tables following, the statistics for the fiscal year having been added, to compare with the record of imports of iron ore into the United States from Canada, as published in the 'Foreign Commerce and Navigation of the United States, Washington, D.C., and shown in Table 6a. It so happened that from 1901 to 1906 the figures in the Canadian reports were inaccurate, owing to reasons explained in foot-notes to the tables.

IRON.—TABLE 5.

## Exports of Iron Ore, Calendar Years, 1893-1909.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1893.....	2,419	7,590	1902*.....	428,901	1,065,019
1894.....		21,294	1903*.....	368,233	922,571
1895.....	1,571	3,909	1904*.....	168,828	401,738
1896.....	1,033	1,911	1905*.....	168,289	407,881
1897.....	403	811	1906.....	74,778	149,177
1898.....	182	278	1907.....	25,901	45,907
1899.....	4,145	9,538	1908.....	(a)	.....
1900.....	5,527	13,511	1909.....	21,956	61,954
1901*.....	306,199	762,283			

\* The export figures for the five years indicated are incorrect owing to a duplication of entries.

(a) The figures of the Trade Report for this year include ferro-products, and are, therefore, omitted.

IRON.—TABLE 6.

## Exports of Iron Ore, Fiscal Years, 1879-1909.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		\$			\$
1879.....	3,562	7,530	1895.....	2,315	5,743
1880.....	30,524	76,474	1896.....	14	35
1881.....	44,677	114,850	1897.....	1,320	2,492
1882.....	43,835	135,463	1898.....	360	402
1883.....	44,914	138,775	1899.....	1,849	4,968
1884.....	25,308	66,549	1900.....	4,327	7,689
1885.....	54,367	132,074	1901*.....	58,401	150,657
1886.....	7,542	23,039	1902*.....	525,983	1,303,901
1887.....	23,345	71,934	1903*.....	293,510	733,230
1888.....	13,544	39,945	1904*.....	233,850	579,883
1889.....	24,752	60,289	1905*.....	224,908	540,909
1890.....	13,811	31,376	1906*.....	148,040	345,540
1891.....	14,648	32,582	1907†.....	34,191	65,367
1892.....	7,707	36,935	1908.....	26,310	46,686
1893.....	7,811	26,114	1909.....	3,933	71,663
1894.....	1,859	9,026			

\* See foot-note to Table 5.

† Nine months ending March 31, 1907.



## IRON.—TABLE 6a.

## Imports of Iron Ore into the United States from Canada, 1893-1909.\*

Year ending June 30.	Short Tons.	Value.	Year ending June 30.	Short Tons.	Value.
		\$			\$
1893.....*	7,706	17,186	1902.....	309,527	685,540
1894.....	301	756	1903.....	144,725	320,263
1895.....	2,681	10,114	1904.....	126,995	283,765
1896.....	39	142	1905.....	120,241	245,623
1897.....	2,535	5,243	1906.....	113,809	220,112
1898.....	1,313	2,904	1907.....	34,731	52,765
1899.....	2,585	5,120	1908.....	32,124	55,617
1900.....	4,477	5,550	1909.....	3,490	12,660
1901.....	34,453	76,159			

\* Compiled from the 'Foreign Commerce and Navigation of the United States.'

## PIG IRON AND STEEL.

The total production of pig iron in Canadian furnaces in 1909 was 757,162 short tons (676,038 long tons), valued at the furnace at \$9,581,864; as compared with 630,835 short tons (563,246 long tons), valued at \$8,111,194, in 1908. An increased production is, therefore, shown of 126,327 tons, or about 20 per cent, and this despite the fact that the Londonderry furnace was out of commission during the whole year. These figures do not include the output from electric furnaces, making ferro-products, which are situated at Welland and Sault Ste. Marie, Ont., and Buckingham, Que.

Of the total output of pig iron during 1909, 17,003 tons, valued at \$371,368, or \$21.84 per ton, were made with charcoal as fuel, and 740,159 tons, valued at \$9,210,496, or \$12.44 per ton, with coke. The amount of charcoal iron made in 1908 was 6,709 tons, and iron made with coke, 624,126 tons.

The classification of the production in 1909, according to the purpose for which it was intended, was as follows: Bessemer, 222,931 tons; basic, 400,921 tons; foundry, including miscellaneous, 116,307 tons.

The American Iron and Steel Association reported the production of Bessemer pig iron in 1908 as 126,348 short tons, as against 173,499 tons in 1907; and the production of basic pig iron in 1908 as 375,659 short tons, as against 382,208 tons in 1907.

The total production of pig iron in 1908 and 1909 is shown by provinces in the following table, the average value per ton being also indicated. In the case of Nova Scotia, a large proportion of the pig iron is directly converted to steel. A nominal value is placed upon this, and does not necessarily represent a market value. The Quebec production is entirely charcoal iron, which has for many years commanded a high price.

## IRON.—TABLE 7.

## Production of Pig Iron by Provinces, 1908-9.

Provinces.	1908.			1909.			Percentage increase or decrease in quantity.
	Tons.	Value.	Value per ton.	Tons.	Value.	Value per ton.	
		\$	\$		\$	\$	%
Nova Scotia.....	352,642	3,554,540	10 08	345,380	3,453,800	10 00	2·1
Quebec.....	6,709	171,383	25 55	4,770	125,623	26 34	28·9
Ontario.....	271,484	4,385,271	16 15	407,012	6,002,441	14 75	49·9
Total .....	630,835	8,111,194	12 86	757,162	9,581,864	12 65	20·0

The increased production in 1909 has been due to the greater activity of the Ontario furnaces, there having been a decreased production in both Nova Scotia and Quebec. For the first time since 1891 the Ontario production has exceeded that of Nova Scotia. The proportions of the whole contributed by the several provinces were, in 1909: Nova Scotia, 45·6 per cent; Ontario, 53·8 per cent, and Quebec about 0·6 per cent. In 1908 the proportions were: Nova Scotia, 56 per cent; Ontario, 43 per cent, and Quebec about 1 per cent. During the past five years the production has exceeded 500,000 tons annually; while from 1898 to 1904 the production ranged from 100,000 tons to 300,000 tons per annum.

Statistics of the total production of pig iron since 1887 by provinces are given in Table 8:—

IRON.—TABLE 8.  
Annual Production of Pig Iron by Provinces, 1887-1909.

Year.	NOVA SCOTIA.		ONTARIO.		QUEBEC.		TOTAL.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$		\$
1887.....	19,320	250,000			5,507	116,192	24,827	366,192
1888.....	17,556	211,403			4,243	101,832	21,799	313,235
1889.....	21,289	383,202			4,632	116,670	25,921	499,872
1890.....	18,382	262,608			3,390	69,080	21,772	331,688
1891.....	21,353	309,527			2,538	59,374	23,891	337,901
1892.....	40,049	583,556			2,394	53,865	42,443	673,421
1893.....	46,472	553,408			9,475	236,875	55,947	790,283
1894.....	41,344	449,583			8,623	196,914	49,967	646,447
1895.....	35,192	417,083			7,262	169,653	42,454	586,736
1896.....	32,351	400,829	28,302	368,942	6,615	154,358	67,268	924,129
1897.....	22,500	230,000	26,115	291,466	9,392	217,235	58,007	738,701
1898.....	21,627	221,677	48,253	530,789	7,135	159,929	77,015	912,395
1899.....	31,100	404,300	64,749	808,157	7,094	164,849	102,943	1,377,306
1900.....	28,133	421,995	62,387	938,725	6,055	140,978	96,575	1,501,698
1901.....	151,130	1,764,017	116,371	1,599,413	6,875	149,493	274,376	3,512,923
1902.....	237,244	2,477,767	112,688	1,584,273	7,970	181,501	357,902	4,243,541
1903.....	201,246	2,186,273	87,004	1,345,464	9,635	210,973	297,885	3,742,710
1904.....	164,488	1,700,130	127,845	1,746,126	11,121	241,729	303,454	3,687,985
1905.....	261,014	2,440,722	256,704	3,868,197	7,588	166,267	525,306	6,475,186
1906.....	315,008	3,439,217	275,558	4,338,275	7,845	177,644	598,411	7,955,136
1907.....	366,456	4,211,913	275,459	4,581,309	10,047	232,004	651,962	9,125,226
1908.....	352,642	3,554,540	271,484	4,385,271	6,709	171,383	630,835	8,111,194
1909.....	345,380	3,453,800	407,012	6,002,441	4,776	125,623	757,162	9,581,864

*Pig Iron Prices.*—The selling prices of pig iron in Toronto and Montreal, according to quotations published in trade journals, showed comparatively little variation during the year. In Toronto, the quotation was practically constant at from \$19.50 to \$20 throughout the year. In Montreal, prices ranged from \$18.50 to \$20.50 for Midland or Hamilton pig iron.

In Pittsburgh, Pa., Bessemer iron was quoted at \$16.50 in January, falling to \$14.50 in May, and gradually increasing to \$19 in December. Basic iron in the same market was quoted at \$15.50 in January, falling to \$14 in May, and increasing to \$17 in December.

The quantities of iron ore, coke, charcoal, limestone, etc., consumed in blast furnaces in 1908 and 1909, are shown as follows:—

IRON.—TABLE 9.

## Ore, Fuel, and Flux charged to Blast Furnaces, in years 1908-9.

	1908.			1909.		
	Quantity.	Value.	Canadian and Imported.	Quantity.	Value.	Canadian and Imported.
		\$	%		\$	%
Canadian iron ore and mill cinder..... tons.	209,266	741,491	17 }	257,502	892,947	17 }
Imported iron ore..... "	1,051,445	2,432,484	83 }	1,235,000	2,989,512	83 }
Canadian coke..... "	492,076	1,604,411	60 }	412,016	1,339,032	45 }
*Imported coke..... "	325,670	1,525,711	40 }	507,255	2,214,578	55 }
Charcoal..... bushels.	1,121,990	85,738	.....	1,779,258	170,050	.....
Canadian limestone..... tons.	418,661	289,705	87 }	423,140	328,091	81 }
Imported "..... "	64,404	53,436	13 }	97,936	83,091	19 }

\* Including coke made from imported coal.

Previous to 1896 the pig iron made was entirely from Canadian ore. Since that date, however, increasing quantities of imported ore have been used, as well as imported fuels and fluxes, until in 1909 about 83 per cent of the ore charged, 55 per cent of the coke, and 19 per cent of the limestone were imported. This condition, of course, is due to questions of cost and transportation affecting each furnace. Just as the Newfoundland ore can be more cheaply and certainly laid down in Sydney, so also American coke can be delivered at Ontario furnaces more cheaply than Nova Scotia coke. In Ontario the coke fuel is all imported, and in the case of the furnaces at Sault Ste. Marie and Port Arthur the flux is imported. Of the ore used in this Province in 1909, about 44 per cent was imported, as compared with 65 per cent in 1908. The development of new ore bodies in this Province may possibly, in the near future, provide a domestic supply of ore, but for fuel Ontario will probably be dependent for some time upon United States sources.

According to returns made to the Department of Trade and Commerce in connexion with claims for bounty, 126,298 tons only of the total pig iron production in Canada in 1909 were credited to Canadian ore, and 607,718 tons to imported ore, and bounty paid upon it as such. No bounty is paid on the iron credited to the mill cinder, scale, etc., so that the above figures do not represent the total output of the furnaces.



Statistics of the quantities of ore, fuel, and flux charged to Canadian blast furnaces since 1887 are shown in the following table:—

IRON.—TABLE 10.

## Iron Ore, Fuel, and Flux charged to Furnaces since 1887.

Calendar Year.	IRON ORE CHARGED.		FUEL CHARGED.			Lime- stone.
	Canadian.	Imported.	Charcoal.	*Coke from Cana- dian Coal.	Imported Coke.	
				Tons.	Tons.	
1887.....	60,434		940,400	33,581		17,171
1888.....	54,956		804,286	30,228		16,857
1889.....	65,670		755,800	36,333		22,122
1890.....	57,304		589,860	34,073		18,478
1891.....	60,933		441,812	32,796		11,377
1892.....	96,948		1,121,365	52,622		22,967
1893.....	124,053		1,302,720	65,332		27,797
1894.....	108,871		1,173,970	60,026		35,101
1895.....	93,208		789,561	51,629		31,585
1896.....	96,560	46,300	756,600	50,067	33,990	37,462
1897.....	53,658	55,722	1,031,800	35,800	27,810	31,273
1898.....	57,881	77,107	836,400	31,952	50,407	33,913
1899.....	66,384	120,650	1,928,025	44,844	64,648	51,826
1900.....	71,341	112,042	1,799,737	45,021	59,345	52,966
1901.....	156,613	361,016	1,835,736	207,835	115,367	169,399
1902.....	125,664	559,381	2,146,623	362,208	112,314	293,594
1903.....	82,035	485,911	2,322,030	350,190	96,540	277,452
1904.....	180,932	454,671	3,477,470	257,182	130,210	211,278
1905.....	116,974	861,847	4,404,394	365,897	243,882	369,715
1906.....	221,733	982,740	2,168,476	462,672	304,676	456,036
1907.....	244,104	1,117,260	1,682,085	521,068	327,082	488,462
1908.....	209,266	1,051,445	1,121,990	492,076	325,670	483,065
1909.....	257,502	1,235,000	1,779,258	412,016	507,255	526,076

\* Includes for the first ten years small quantity of coal.

Of sixteen completed furnaces, fifteen were in blast in 1909, for varying periods of time. The operating companies, with numbers and capacities of furnaces, were as follows:—

Dominion Iron and Steel Company, Sydney, C.B.: four completed furnaces of 280 tons capacity each per day; two operated throughout 1909, one for 168 days, and the fourth for 203 days.

Nova Scotia Steel and Coal Company, Limited, New Glasgow, N.S.: one furnace at Sydney Mines, C.B., of 200 tons capacity; operated throughout 1909.

Londonderry Iron and Mining Company, Limited, Londonderry, N.S.: one furnace of 100 tons capacity; idle throughout the year.

Canada Iron Corporation, Limited, Montreal, Que.: two small furnaces of seven and eight tons capacity, at Drummondville, Que., operated 3½ days; one furnace of 25 tons daily capacity, at Radnor Forges, Que., operated seven months during 1909; one furnace of 125 tons, at Midland, Ont., operated all year.

Standard Chemical Company of Toronto, Deseronto, Ont.: one furnace with a daily capacity of 50 tons; operated six months during 1909.

Hamilton Steel and Iron Company, Hamilton, Ont.: two furnaces: one of 200 tons capacity, operated throughout 1909; a second furnace of 300 tons capacity, operated 276 days in 1909.

Algoma Steel Company, Limited, Sault Ste. Marie, Ont.: two furnaces at Steelton, near Sault Ste. Marie, of 250 tons capacity each; operated throughout the year.

The Atikokan Iron Company, Limited, Port Arthur, Ont.: one furnace of 100 tons capacity; operated for  $4\frac{1}{2}$  months during 1909.

The total daily capacity of the sixteen furnaces is about 2,735 tons.

The number of men employed in 1909 was reported as 1,486, and the wages paid, \$879,429. Of the sixteen completed furnaces, eleven were in blast and five idle on December 31, 1909.

Very little pig iron has been exported from Canada. The quantities exported during the past two years were, as shown in Table 17: 5,063 tons, valued at \$186,778, in 1909; and 290 tons, valued at \$10,614, in 1908. The figures for 1909 include ferro-silicon and other similar iron alloys. Considerable quantities of pig iron are, however, imported. During the calendar year 1909 the imports of ordinary pig iron were 147,925 tons, valued at \$1,798,172, and of charcoal pig, 413 tons, valued at \$5,727, or a total of 148,338 tons, valued at \$1,803,919. During the calendar year 1908 the imports were 58,365 tons, valued at \$790,433: comprising ordinary pig, 57,343 tons, valued at \$771,615, and charcoal iron, 1,022 tons, valued at \$18,818.

The annual imports of these two classes of pig iron since 1880 are shown in the following table, the statistics being given for the fiscal year. The duty or general tariff on pig iron is \$2.50 per ton.

## IRON.—TABLE 11.

## Annual Imports of Pig Iron since 1880.

Fiscal Year.	PIG IRON.		CHARCOAL PIG IRON.		TOTAL.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
1880.....	(a) 23,159	371,956			23,159	371,956
1881.....	(a) 43,630	715,997			43,630	715,997
1882.....	56,594	811,221	6,837	211,791	63,431	1,023,012
1883.....	75,295	1,085,755	2,198	58,994	77,493	1,144,749
1884.....	49,291	653,708	2,893	66,602	52,184	720,310
1885.....	42,279	545,426	1,119	27,333	43,398	572,759
1886.....	42,463	528,483	3,185	60,086	45,648	588,569
1887.....	46,295	554,388	3,919	77,420	50,214	631,808
1888.....	(b) 48,973	648,012			48,973	648,012
1889.....	(b) 72,115	864,752			72,115	864,752
1890.....	(b) 87,613	1,148,078			87,613	1,148,078
1891.....	(b) 81,317	1,085,929			81,317	1,085,929
1892.....	(b) 68,918	886,485			68,918	886,485
1893.....	56,849	682,209	5,944	84,358	62,793	766,567
1894.....	42,376	483,787	2,906	34,968	45,282	518,755
1895.....	31,637	341,259	2,780	31,171	34,417	372,430
1896.....	36,131	394,591	917	11,726	37,048	406,317
1897.....	25,766	291,788	2,936	35,373	28,702	327,161
1898.....	37,186	382,103	2,250	23,533	39,436	405,636
1899.....	44,261	452,911	1,955	19,123	46,216	472,034
1900.....	49,767	811,490	1,816	38,736	51,583	850,226
1901.....	35,293	548,033	490	7,121	35,783	555,154
1902.....	39,978	585,077	38	726	40,016	585,803
1903.....	91,730	1,338,574	882	16,352	92,612	1,354,926
1904.....	62,515	894,728			62,515	894,728
1905.....	71,005	857,879			71,005	857,879
1906.....	96,797	1,401,047			96,797	1,401,047
1907*.....	150,127	2,280,860	30	675	150,157	2,281,535
1908.....	210,053	3,448,125	2,237	45,475	212,290	3,493,600
1909.....	57,669	857,357	922	16,575	58,591	873,932
1910.....	158,910	2,118,445	596	8,690	159,506	2,127,135

\* Nine months ending March.

(a) Comprises pig iron of all kinds.

(b) These figures appear in Customs reports under heading 'iron in pigs, iron kentledge, and cast-iron.'

## IRON.—TABLE 11a.

## Annual Exports of Pig Iron, 1896-1909.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1896.....	2,187	55,448	1903.....	4,400	78,382
1897.....	3,099	81,381	1904.....	21,016	200,363
1898.....	1,278	32,645	1905.....	866	22,284
1899.....	6,981	149,190	1906.....	305	7,429
1900.....	3,513	88,052	1907.....	439	13,504
1901.....	57,650	593,739	1908.....	290	10,614
1902.....	75,195	778,619	1909.....	5,063	186,778

*World's Production.*—The production of pig iron in other countries is given hereunder for the past four years, in order to show the relative position occupied by Canada in the production of this metal.

IRON.—TABLE 12.

Production of Pig Iron in Principal Countries of the World, from 1906 to 1909: metric tons.

	1906.	1907.	1908.	1909.
United States	25,713,556	26,195,340	16,191,907	26,209,677
Germany.	12,292,819	12,875,159	11,805,321	12,625,575
United Kingdom.	10,347,385	10,276,689	9,202,280	9,819,469
France.	3,314,162	3,590,235	3,400,771	3,544,638
Russia	2,691,606	2,820,604	2,800,653	2,871,332
Austria-Hungary.	1,687,581	1,872,684	1,518,549	**
Belgium.	1,375,775	1,406,980	1,270,050	1,632,350
Canada.	542,875	591,456	572,290	686,893
Sweden.	604,789	615,778	567,821	443,000
Spain.	379,241	355,240	403,554	**
Italy.	135,296	112,232	112,924	207,800
China.	*34,305	*36,306	66,409	74,000
Japan.	42,679	51,943	45,396	**
Australasia.		29,902	30,392	**

\* Exports. \*\* Not available.

## FERRO-PRODUCTS.

These are made in small quantities in electric furnaces at Welland, and Sault Ste. Marie, Ont., and at Buckingham, Que.

At Buckingham the Electric Reduction Company, Limited, has for a number of years been making ferro-chrome, ferro-silicon, ferro-phosphorus, and other products, though for the past year or more the Company's operations, it is understood, have been restricted to the manufacture of phosphorus. The Electro Metals Company at Welland, Ont., has four furnaces of from 1,000 to 1,500 horse-power each in which ferro-silicon is made, the daily production being from five to eight tons. The Algoma Steel Company, at Sault Ste. Marie, makes ferro-silicon for its own consumption. Although complete returns of production were not received, the output was probably somewhat under 5,000 tons, and valued at about \$55 per ton.

The imports of ferro-silicon, ferro-manganese, etc., during the calendar year 1909, were 17,699 tons, valued at \$411,536, an average of \$23.25 per ton. The imports since 1887 are shown in Table 13, the figures of the table being for the fiscal year.



## IRON.—TABLE 13.

## Imports of Ferro-Manganese, Etc., 1887-1909.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		\$			\$
*1887 .....	123	1,435	†1899 .....	1,160	22,539
*1888 .....	1,883	29,812	†1900 .....	1,149	39,064
*1889 .....	5,868	72,108	†1901 .....	1,512	38,954
*1890 .....	696	18,895	†1902 .....	6,513	150,977
*1891 .....	2,707	40,711	†1903 .....	6,350	162,710
*1892 .....	1,311	23,930	†1904 .....	2,975	75,554
*1893 .....	529	15,858	†1905 .....	12,935	246,815
*1894 .....	284	9,885	†1906 .....	15,023	462,739
†1895 .....	164	5,408	†1907 (9 months).....	16,414	610,875
†1896 .....	652	12,811	†1908 .....	17,417	612,062
†1897 .....	426	9,233	†1909 .....	13,053	388,024
†1898 .....	1,418	22,516			

\* These amounts include : ferro-manganese, ferro-silicon, spiegel, steel bloom ends and crop ends of steel rails, for the manufacture of iron or steel.

† Ferro-silicon, spiegeleisen, and ferro-manganese.

## STEEL.

Returns of steel production received direct from the producers showed a total production of ingots and castings in 1909 of 754,719 tons, valued at \$14,359,800; as compared with 588,763 tons, valued at \$10,916,602, in 1908, and 706,982 tons, valued at \$15,612,590, in 1907. Of the production in 1909, 535,988 tons were open-hearth ingots; 203,715 tons, Bessemer ingots; 14,013 tons, direct steel castings, and 1,003 tons of other steels. Compared with 1908, there is an increase in total production of 165,956 tons, or 28.2 per cent. The production during the past three years is shown in Table 14 below.

## IRON.—TABLE 14.

## Production of Steel, 1907, 1908, and 1909.

Description.	1907.		1908.		1909.	
	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.
		\$		\$		\$
Ingots, open-hearth (basic)	459,240	9,157,703	443,442	7,684,277	535,988	9,372,615
Bessemer (acid)...	225,989	4,293,791	135,557	2,535,287	203,715	3,829,012
Castings, open-hearth....	20,602	2,031,380	9,051	617,126	14,013	1,043,460
Other steels.....	1,151	129,716	713	79,912	1,003	114,713
Total.....	706,982	15,612,590	588,763	10,916,602	754,719	14,359,800

Statistics of production of steel ingots and castings since 1894 are given in the following table, the figures from 1894 to 1906, inclusive, having been collected and published by the American Iron and Steel Association, those for 1907 to 1909 being as shown in Table 14.

**IRON.—TABLE 15.**  
**Annual Production of Steel Ingots and Castings, 1894-1909.**

Calendar Year.	Short Tons.	Calendar Year.	Short Tons.	Calendar Year.	Short Tons.
1894.....	28,767	1900.....	26,406	1906.....	639,396
1895.....	19,040	1901.....	29,214	1907.....	706,982
1896.....	17,920	1902.....	203,881	1908.....	588,763
1897.....	20,608	1903.....	203,296	1909.....	754,719
1898.....	24,125	1904.....	166,381		
1899.....	24,640	1905.....	451,863		

Following is a list of firms making steel in Canada:—

Dominion Iron and Steel Company, Sydney, C.B.  
 Nova Scotia Steel and Coal Company, New Glasgow, N.S.  
 Montreal Steel Works, Limited, Montreal, Que.  
 The Algoma Steel Company, Sault Ste. Marie, Ont.  
 The Hamilton Steel and Iron Company, Hamilton, Ont.  
 The Wm. Kennedy Sons, Limited, Owen Sound, Ont.  
 The Ottawa Steel Castings Company, Limited, Ottawa, Ont.  
 The Ontario Iron and Steel Company, Limited, Welland, Ont.

*Rolled Products, etc.*—Complete statistics of the production of rolled products and manufactured steel have not been obtained. The production of steel rails, however, in 1909 was returned as 377,642 short tons; as compared with 300,935 short tons produced in 1908.

The production of finished rolled iron and steel in Canada from 1904 to 1908, as ascertained by the American Iron and Steel Association, was as follows, in long tons:—

**Annual Production of Rolled Iron and Steel, 1904-8.**

Products—Gross Tons.	1904.	1905.	1906.	1907.	1908.
Rails.....	36,216	178,885	312,877	311,461	268,692
Structural shapes and wire rods.....	11,195	48,850	48,351	65,541	41,520
Plates and sheets.....	3,102	4,944	15,202	18,493	11,656
Nail plate.....	5,030	4,110	2,183	1,720	2,126
All other finished rolled forms.....	124,495	149,037	193,129	202,964	172,523
Totals.....	180,038	335,826	571,742	600,179	496,517

#### BOUNTIES.

Bounties on iron and steel made in Canada were provided for by the Dominion government in 1897 (Chapter 6, Statutes of Canada, 1897). This

Act was amended in 1899 (Chapter 8, Statutes of Canada, 1899), and again in 1903 (Chapter 68, Statutes of Canada, 1903). The latter Act provided for the payment of bounty until June 30, 1907. On April 27, 1907, a new Act was passed (Chapter 24, Statutes of Canada, 1907), providing for the further payment of bounties from January 1, 1907, to December 31, 1910, and in the case of pig iron made by electric smelting, until December 31, 1912. The Act is as follows:—

### **An Act Respecting Bounties on Iron and Steel made in Canada.**

(Assented to, 27th April, 1907.)

His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. The Governor in Council may authorize the payment out of the Consolidated Revenue Fund of the following bounties on the undermentioned articles when manufactured in Canada for consumption therein, viz.:—

(a) In respect of pig iron manufactured from ore, on the proportion from Canadian ore produced during the calendar year:—

1907.. . . .	\$2 10 per ton.
1908.. . . .	2 10 “
1909.. . . .	1 70 “
1910.. . . .	0 90 “

(b) In respect of pig iron manufactured from ore, on the proportion from foreign ore produced during the calendar year:—

1907.. . . .	\$1 10 per ton.
1908.. . . .	1 10 “
1909.. . . .	0 70 “
1910.. . . .	0 40 “

(c) On puddled iron bars manufactured from pig iron made in Canada during the calendar year:—

1907.. . . .	\$1 65 per ton.
1908.. . . .	1 65 “
1909.. . . .	1 05 “
1910.. . . .	0 60 “

(d) In respect of rolled, round wire rods not over three-eighths of an inch diameter, manufactured in Canada from steel produced in Canada from ingredients of which not less than fifty per cent of the weight thereof consists of pig iron made in Canada, when sold to wire manufacturers for use, or when used in making wire in their own factories in Canada, on such wire rods made after the thirty-first day of December, one thousand nine hundred and six, six dollars per ton.

(e) In respect of steel manufactured from ingredients of which not less than fifty per cent of the weight thereof consists of pig iron made in Canada, on such steel made during the calendar year:—

1907.. . . . .	\$1 65 per ton.
1908.. . . . .	1 65 “
1909.. . . . .	1 05 “
1910.. . . . .	0 60 “

(2) No bounty shall be paid under the foregoing provisions in respect of iron or steel made in Canada by electric process after the thirty-first day of December, one thousand nine hundred and eight.

2. The Governor in Council may authorize the payment out of the Consolidated Revenue Fund of the following bounties on the undermentioned articles when manufactured in Canada for consumption therein, viz. :—

(a) On pig iron manufactured from Canadian ore by the process of electric smelting during the calendar year :—

1909.. . . . .	\$2 10 per ton.
1910.. . . . .	2 10 “
1911.. . . . .	1 70 “
1912.. . . . .	0 90 “

(b) On steel manufactured by electric process direct from Canadian ore, and on steel manufactured by electric process from pig iron smelted in Canada by electricity from Canadian ore during the calendar year :—

1909.. . . . .	\$1 65 per ton.
1910.. . . . .	1 65 “
1911.. . . . .	1 05 “
1912.. . . . .	0 60 “

(2) Bounty, as on pig iron under this section, may be paid upon the molten iron from the ore which in the electric furnace enters into the manufacture of steel by the direct process, the weight of such iron to be ascertained from the weight of the steel so manufactured.

3. No bounty shall be paid on steel ingots from which steel blooms and billets for exportation from Canada are manufactured.

4. The Governor in Council may make regulations to carry out the intention of this Act.

5. The Minister of Trade and Commerce shall be charged with the administration of this Act.

6. Chapter 8 of the Statutes of 1899, Chapter 68 of the Statutes of 1903, and Chapter 39 of the Statutes of 1904, are repealed.

7. This Act shall be deemed to have come into force on the first day of January, one thousand nine hundred and seven.’



The amount of bounties paid on iron and steel during the calendar years 1908 and 1909, as kindly furnished by the Department of Trade and Commerce, is shown in Table 16, following:—

IRON.—TABLE 16.

## Bounty Paid during the Calendar Years 1908 and 1909.

Product on which Bounty was paid.	1908.		1909.	
	Tons.	Bounty.	Tons.	Bounty.
		\$		\$
Pig iron made from Canadian ore ...	101,647	213,458 34	126,298	214,705 80
" " imported ore.....	517,427	569,169 93	607,718	425,402 64
Total pig iron.....	619,074	782,628 27	734,016	640,108 44
Steel ingots.....	556,289	917,876 63	729,189	766,470 41
Steel wire rods.....	49,630	297,778 68	81,405	488,432 70
Totals.....	1,224,993	1,998,283 58	1,544,610	1,895,011 55

The total bounty payments during the calendar year 1909 on iron and steel were \$1,895,011.55, the amount paid to the several companies and the quantities of the different products on which the bounties were paid being shown in the following tables:—

# Bounties Paid on Pig Iron, manufactured in Canada, during the Twelve Months ending December, 1909.

Name of Claimant.	Tons of Canadian ore used.	Tons of foreign ore used.	Tons of pig iron made from Canadian ore.	Bounty on pig iron from Canadian ore.	Tons of pig iron from foreign ore.	Bounty on pig iron from foreign ore.	Total tons of pig iron produced.	Amount of claim.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Dominion Iron and Steel Co., Ltd.	1,742 00	577,065 00	908 27	1,544 06	277,042 95	193,930 06	277,951 22	195,474 12
Hamilton Steel and Iron Co., Ltd.	121,121 14	181,131 15	68,001 34	115,602 30	88,916 55	62,241 59	156,917 89	177,843 89
Nova Scotia Steel and Coal Co., Ltd.	66,930 67	110,649 00	35,041 07	59,569 82	57,885 00	40,519 50	57,885 00	40,519 50
Algoma Steel Co., Ltd.	13,452 12	283,531 65	8,882 22	15,099 76	140,525 98	98,368 19	175,567 05	157,938 01
Atkolan Iron Co., Ltd.	60 90	.....	19 94	33 90	.....	.....	8,882 22	15,099 76
Canada Iron Corp., Ltd., (Drummondville)	17,280 83	58,421 12	9,267 27	15,652 37	30,602 43	21,421 73	39,809 70	37,074 10
" " (Midland)	9,884 84	1,487 81	3,939 56	6,697 22	810 42	567 28	4,749 98	7,264 50
" " (Radnor)	622 21	23,201 73	297 88	506 37	11,934 76	8,354 29	12,232 64	8,860 66
Standard Chemical Co. of Toronto, Deseronto.	231,094 71	1,235,487 46	126,297 55	214,705 80	607,718 09	425,402 64	734,015 64	640,108 44

## Bounties Paid on Steel Ingots during the Twelve Months ending December, 1909.

	Tons of Canadian pig iron used.	Tons of foreign pig iron used.	Tons of other ingredients.	Tons of steel made.	Bounty paid.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Dominion Iron and Steel Co., Ltd.	279,651 44	.....	95,346 60	332,320 99	348,937 06
Hamilton Steel and Iron Co., Ltd.	43,722 56	.....	40,108 49	76,847 94	80,690 36
Nova Scotia Steel and Coal Co., Ltd.	52,006 42	.....	20,966 45	64,239 94	67,451 95
Algoma Steel Co., Ltd.	181,842 04	6,978 82	31,045 71	199,770 05	209,758 55
Lake Superior Iron and Steel Co., Ltd.	26,466 77	54 50	26,940 74	51,740 24	54,327 26
*Ontario Iron and Steel Co., Ltd.	3,222 17	.....	2,883 07	4,270 21	5,305 23
	588,911 40	7,033 32	217,291 06	729,189 37	766,470 41

\* Includes a small quantity produced in 1908.

During the year bounty to the amount of \$488,432.70 was paid the Dominion Iron and Steel Co., Ltd., for 81,405.42 tons of wire rods made.

**Total Bounty paid to each Company during the past three Fiscal years.**

Corporations.	1907.	1908.	1909.
	\$ cts.	\$ cts.	\$ cts.
Algoma Steel Co., Ltd.....	348,292 48	534,025 50	367,696 56
Atikokan Iron Company, Ltd.....	2,062 58	17,210 46	15,099 76
* { Canada Iron Furnace Co., Ltd } { John McDougall and Co. }.....	28,793 35 2,598 75	51,213 12 7,299 30	44,372 50 8,860 66
† Deseronto Iron Co., Ltd.....	669,042 56	1,228,915 39	1,032,843 88
Dominion Iron and Steel Co., Ltd.....	235 20		
Electric Reduction Co., Ltd.....	125,678 25	222,490 31	258,534 25
Hamilton Steel and Iron Co., Ltd.....	28,505 79	37,441 52	
Londonderry Iron and Mining Co., Ltd.....		17,500 60	54,327 26
Lake Superior Iron and Steel Co.....	881 19		
Montreal Rolling Mills Co.....	93,710 89	181,436 26	107,971 45
Nova Scotia Steel and Coal Co., Ltd.....		251 77	5,305 23
Ontario Iron and Steel Co.....			
	1,299,801 04	2,302,152 35	1,895,011 55

\* Amalgamated in 1909 to form Canada Iron Corporation, Ltd.

† In 1909 worked by the Standard Chemical Co. of Toronto.

**Total Bounties on Iron and Steel paid by the Government of Canada since 1896.**

Year ended.	Pig Iron.	Puddled iron bars.	Steel.	Manufactures of Steel.
	\$	\$	\$	\$
June 30, 1896.....	104,105	5,611	59,499	
" 1897.....	66,509	3,019	17,366	
" 1898.....	165,654	7,706	67,454	
" 1899.....	187,954	17,511	74,644	
" 1900.....	238,296	10,121	64,360	
" 1901.....	351,259	16,703	100,058	
" 1902.....	693,108	20,550	77,431	
" 1903.....	666,001	6,702	729,102	
" 1904.....	533,982	11,669	347,990	15,321
" 1905.....	624,667	7,895	676,318	231,324
" 1906.....	687,632	5,875	941,000	369,832
March 31, 1907 (9 months).....	385,231	312	575,259	338,999
" 1908.....	863,817		1,092,201	347,135
" 1909.....	693,423		888,100	333,091
Totals.....	6,261,638	113,674	5,660,782	1,635,702

## EXPORTS AND IMPORTS OF IRON AND STEEL GOODS.

The value of the exports of iron and steel products from Canada in 1909 was \$2,598,756, as compared with a value of \$2,098,138 in 1908. Details are shown in Table 17 following:—

IRON.—TABLE 17.

Exports of Iron and Steel goods, the product of Canada, during the Calendar Years 1908 and 1909.

		1908.		1909.	
		Quantity.	Value.	Quantity.	Value.
			\$		\$
Stoves. . . . .	No.	651	8,258	774	10,330
Castings, N.E.S. . . . .	\$		28,062		25,038
Pig iron. . . . .	Tons.	290	10,614	5,063	186,778
Machinery (linotype machines). . . . .			126,590		43,686
" N.E.S. . . . .			285,257		421,707
Sewing machines . . . . .	No.	9,697	109,002	12,759	147,402
Typewriters . . . . .	"	3,720	169,939	3,749	238,167
Scrap iron and steel. . . . .	Cwt.	92,566	73,807	410,506	305,256
Hardware, tools, etc. . . . .	\$		57,631		52,207
" N.E.S. . . . .			59,304		35,507
Steel and manufactures of. . . . .	"		1,169,674		1,132,678
Totals. . . . .			2,098,138		2,598,756

Nearly 44 per cent of the total exports in 1909 are entered as steel and its manufactures. The export of these products has grown very rapidly during the past few years, having increased from a value of \$477,766 in 1907 to a value of \$1,132,678 in 1909.

The total imports of iron and steel goods, as compiled from the annual reports of Trade and Navigation, are given in Table 19, showing the imports subject to duty, and Table 20, showing the imports free of duty.

The total value of the imports during the fiscal year ending March, 1909, was \$40,393,431; as compared with \$61,819,698 during the previous fiscal year.

The weights or quantities are in many cases not given, so that it is not possible to state the total tonnage of iron and steel imported. A minimum estimate of the tonnage can, however, be arrived at by selecting those items for which the weights are given. This has been done, and the results are given in Table 18.

The imports of these selected items showed a total tonnage in 1909 of 545,594; as compared with 1,079,000 tons in 1908, and 783,025 tons during the nine months ending March, 1907. The statistics for 1909 show a falling off in imports in all classes of iron and steel goods.



## IRON.—TABLE 18.

Imports of some Iron and Steel products of which the quantities are available.

Material.	Twelve months end- ing March, 1908.	Twelve months end- ing March, 1909.
	Tons.	Tons.
Pig iron.....	212,290	58,591
Ferro-products and chrome steel.....	17,661	13,206
Ingots, blooms, billets, puddled bars, etc. . . . .	21,222	8,887
Scrap and scrap steel.....	69,213	26,212
Plates and sheets.....	126,172	101,317
Bars, rods, hoops, bands, etc.....	98,631	69,818
Structural iron and steel.....	373,871	162,735
Rails and connexions.....	52,706	32,543
Pipe and fittings.....	25,090	18,309
Nails and spikes.....	2,741	1,432
Wire.....	57,046	39,452
Forgings, castings, and manufactures.....	22,357	13,092
Total.....	1,079,000	545,594

### Imports of Iron and Steel Goods subject to Duty.

Material.						
	Twelve Months ending March, 1908.		Twelve Months ending March, 1909.			
	Quantity.	Value. \$	Quantity.	Value. \$		
Agricultural implements, N. O. P., viz.:—						
Binding attachments.....	No	\$				
Cultivators and weede.....	"					
Drills, seed .....	"					
Farm, road, or field rollers.....	"					
Forks, pronged.....	"					
Harrows.....	"					
Harvesters, self-binding.....	"					
Hay loaders.....	"					
Hay tedders.....	"					
Hoes.....	"					
Horse rakes.....	"					
Knives, hay or straw.....	"					
Knives, edging.....	"					
Lawn mowers.....	"					
Manure spreaders.....	"					
Mowing machines.....	"					
Ploughs.....	"					
Post hole diggers.....	"					
Potato diggers.....	"					
Rakes, N. O. P.....	"					
Reapers.....	"					
Scythes.....	"					
Sickles or reaping hooks.....	Doz.					
Snaths.....	"					
Spades and shovels of iron or steel, N. O. P.....	"					
Spade and shovel blanks, and iron or steel cut to shape for the same.....	"					
Parts of agricultural implements paying 12 $\frac{1}{2}$ per cent and 17 $\frac{1}{2}$ per cent.....	"					
" " " " " " " " " " " " " "	"					
All other agricultural implements, N. O. P.....	"					
Anvils and vises.....	"					
Cart or wagon skreens or boxes.....	"					
Springs N. O. P. and parts thereof, of iron or steel, for railway, tramway, or other vehicles.....	Lbs. Cwt.					

IRON.—TABLE 19—Continued.

Imports of Iron and Steel Goods subject to duty.

Material.	Twelve months ending March, 1908.		Twelve months ending March, 1909.	
	Quantity.	Value. \$	Quantity.	Value.
Axle and axle parts, N. O. P., and axle blanks and parts thereof of iron or steel for railway, Cwt.	43,895	136,558	39,153	100,731
tramway, or other vehicles.....				
Bar iron or steel, rolled, whether in coils, bundles, rods or bars, comprising rounds, ovals, squares, and flats, N. O. P.....	1,497,690	2,580,823	785,981	1,223,995
Butts and hinges N. O. P.....		65,773		38,246
Canada plates, Russia iron,terne plate, and rolled sheets of iron and steel coated with zinc, spelter or other metal, of all widths or thicknesses, N. O. P.....	79,722	262,134	74,860	233,753
Castings, iron or steel, N. O. P.....		593,672		328,368
Cast iron pipe of every description.....	431,034	598,358	320,275	370,085
Cast scrap iron.....	26,371	458,489	15,190	202,842
Chains, coil chains, chain links, and chain shackles of iron or steel of $\frac{1}{16}$ diameter, and over. Cwt.	81,991	281,304	45,886	131,324
Chains, N. O. P.....		52,864		34,221
Tacks, shoe.....	16,735	1,033	23,322	1,929
Nails, brads, spikes, and tacks of all kinds, N. O. P.....	269,331	16,346	335,638	22,678
Engines, etc.:—				
Locomotives for railways.....	195	1,233,089	113	384,086
Motor cars for railways and tramways.....	11	12,002	12	3,900
Engines, fire.....	28	19,880	17	13,411
" gasoline.....	3,230	693,153	4,076	714,574
" steam.....	659	422,585	380	234,224
Boilers, steam.....	517	274,158	372	114,975
" N. O. P.....	1,197	67,161	287	39,144
Fire extinguishing machines, including sprinklers for fire protection.....		51,014		78,690
Fittings, iron or steel, for iron or steel pipe of every description.....		499,050		282,552
Flat eye-bar blanks, not punched or drilled, for use exclusively in the manufacture of bridges or of steel structural work, or in car construction.....	7,077,317		4,590,270	
" N. O. P.....				
Forgings of iron and steel of whatever size, shape, or in whatever stage of manufacture, N. O. P., and steel shafting, turned, compressed or polished and hammered, drawn or cold rolled iron or steel bars or shapes, N. O. P.....	89	5,224	3	80
Hardware, viz.: builders, cabinet-makers, upholsterers, harness-makers, saddlers and carriage hardware, including curry-combs, N. O. P.....	17,417	612,062	13,053	388,024
Horse, mule, and ox shoes.....	3,021,923	149,219	2,270,838	96,368
Iron or steel billets, weighing not less than 60 pounds per lineal yard.....		578,090		365,230
".....		10,212		5,880
Cwt.....	297,329	416,163	78,797	95,350

IRON.—TABLE 19.—Continued.  
Imports of Iron and Steel Goods subject to Duty

Material.	Twelve months ending March, 1908.		Twelve months ending March, 1909.	
	Quantity.	Value. \$	Quantity.	Value. \$
Iron or steel ingots, cogged ingots, blooms, slabs, puddled bars, and loops, or other forms, N.O.P., less finished than iron or steel bars, but more advanced than pig iron, except castings.....	94,441	135,177	74,305	53,135
"    bridges or parts thereof, iron or steel structural work, columns, shapes or sections, drilled, punched or in any further stage of manufacture than as rolled or cast, N.O.P.....	244,992	645,608	69,636	176,613
Iron in pig.....	210,053	3,448,125	57,669	887,357
"    charcoal.....	2,237	45,475	922	16,575
Locks of all kinds.....	.....	336,405	.....	222,000
Machines, machinery, etc.:—				
Automobiles and motor vehicles of all kinds.....	674	912,371	533	585,097
"    "    "    parts of ..	.....	136,858	.....	127,143
Fanning mills.....	1,648	23,051	1,160	12,813
Grain crushers.....	113	2,801	12	263
Windmills and complete parts thereof.....	708	36,171	754	38,284
Ore crushers and rock crushers, stamp mills, cornish and belted rolls, rock drills, air compressors, cranes, derricks, and percussion coal cutters.....	.....	178,951	.....	176,014
Portable machines:—				
Fodder or feed cutters.....	203	2,302	187	1,740
Horse-powers for farm purposes.....	25	2,371	20	958
Portable engines with boilers in combination and traction engines for farm purposes.....	700	1,033,868	602	794,854
Portable sawmills and planing mills.....	21	23,352	20	18,759
Steam shovels.....	14	71,052	29	152,027
Threshing machine separators.....	649	386,583	624	362,083
"    "    "    parts of, including wind-stackers, baggers, weighers, and self-feeders for same, and finished parts thereof for repairs, when imported separately.....	.....	266,427	.....	239,118
All other portable machines, N.O.P., and parts.....	.....	96,254	.....	19,891
Sewing machines.....	16,065	268,198	11,823	207,295
"    "    "    parts of.....	.....	96,745	.....	52,044
Slot machines.....	784	22,569	248	7,832



Machines, typewriting .....	No.	7,058	546,068	6,050	446,851
type-casting and type-setting, and parts thereof, adapted for use in printing offices .....	"	109	241,445	20	123,446
Machines specially designed for ruling, folding, binding, embossing, creasing or cutting paper or cardboard, when for use exclusively by printers, bookbinders, and by manufacturers of articles made from paper or cardboard, including parts thereof, composed wholly or in part of iron, steel, brass, or wood.....	"	595	135,599	266	88,493
Machines for carding, spinning, weaving, or knitting, imported by manufacturers for such purposes.....	"	.....	707,949	.....	823,698
Lithographic presses and type-making accessories for same.....	"	.....	38,331	.....	27,131
Printing presses.....	"	.....	257,522	.....	160,600
All machinery composed wholly or in part of iron or steel, N.O.P., and iron or steel castings, and iron or steel integral parts of all machinery specified in tariff item 453 .....	"	.....	8,005,310	.....	5,516,890
Malleable iron castings and iron or steel casting, N.O.P. ....	Cwt.	12,788	53,561	7,797	34,001
Nails and spikes, composition and sheathing nails.....	Lbs.	17,603	2,862	74,485	4,991
Nails and spikes, cut (ordinary builders).....	Cwt.	4,124	10,359	2,897	6,785
Railway spikes.....	"	29,850	59,665	18,902	34,260
Nails, wire of all kinds, N.O.P.....	"	7,870	27,017	6,088	25,160
Pumps, hand, N.O.P.....	No.	14,566	80,299	11,951	54,216
Iron and steel railway bars or rails of any form, punched or not, N.O.P., for railways, which term for the purposes of this item shall include all kinds of railways, street railways and tramways, even although they are used for private purposes only, and even although they are not used or intended to be used in connexion with the business of common carrying of goods or passengers.....	Tons.	49,187	1,273,084	29,547	797,479
Railway fish-plates.....	"	1,225	55,193	1,784	67,045
Railway tie-plates.....	"	859	40,046	333	15,147
Rolled iron or steel angles, tees, beams, channels, girders, and other rolled shapes or sections, not punched or drilled or further manufactured than rolled, N.O.P.....	Cwt.	660,869	1,064,890	383,529	553,702
Rolled iron or steel beams, channels, angles, and other rolled shapes of iron and steel, not punched, drilled or further manufactured than rolled, weighing not less than 35 pounds per lineal yard, not being square, flat, oval or round shapes, and not being railway bars or rails .....	"	1,474,074	2,202,516	1,050,541	1,444,741
Rolled iron or steel hoop, band, scroll or strip, 12" or less in width, No. 13 gauge and thicker, N.O.P.....	"	52,735	99,977	34,969	59,501
Rolled iron or steel hoop, band, scroll or strip, No. 14 gauge and thinner, galvanized or coated with other metal or not, N.O.P.....	"	105,568	285,670	86,283	204,169
Rolled iron or steel sheets or plates, sheared or unsheared, and skelp iron or steel, sheared or rolled grooves, N.O.P.....	"	317,512	539,220	156,910	242,690
Rolled iron or steel plates not less than 30" in width and not less than $\frac{1}{4}$ " in thickness, N.O.P.....	"	419,733	666,288	335,447	453,205
Rolled iron or steel sheets and strips, polished or not, No. 14 gauge and thinner, N.O.P.....	"	230,839	581,624	204,522	498,705
Rolls of chilled iron or steel .....	"	1,998	6,930	1,547	5,056
Sad or smoothing batters' and tailors' irons .....	\$	.....	7,706	.....	5,886
Safes, doors for safes and vaults .....	"	.....	147,004	.....	92,491
Screws, iron and steel, commonly called wood screws, N.O.P., including lag or coach screws, plated or not, and machine or other screws, N.O.P.....	Gross.	200,357	41,141	100,391	19,219
Scales, balances, weighing beams, and strength-testing machines of all kinds.....	\$	.....	195,464	.....	174,738

IRON.—TABLE 19—Continued.

Imports of Iron and Steel Goods subject to Duty

Material.	Twelve months ending March, 1908.		Twelve months ending March, 1909.	
	Quantity.	Value. \$	Quantity.	Value. \$
Shafting, round, steel, in bars not exceeding 2½" diameter.....	Cwt. 43,387	89,428	28,322	53,747
Sheets, flat, of galvanized iron or steel.....	153,069	484,585	128,002	388,885
Sheets, iron or steel, corrugated, galvanized.....	2,812	9,456	1,328	3,891
Sheets, iron or steel, corrugated, not galvanized.....	522	2,084	244	753
Skates of all kinds, roller or other, and parts thereof.....	114,340	94,616	92,005	49,164
Skelp, iron or steel, sheared or rolled in grooves, imported by manufacturers of wrought iron or steel pipe, for use exclusively in the manufacture of wrought iron or steel pipe in their own factories.....	Cwt. 704,709	1,201,942	685,341	925,417
Steel billets, N.O.P.....	32,681	48,672	24,638	31,869
Stoves of all kinds, for coal, wood, oil, spirits, or gas.....	"	469,881	"	355,786
Stove urns of metal, and dovetails, chaplets, and hinge tubes of tin for use in the manufacture of stoves.....	"	16,267	"	14,753
Switches, frogs, crossings, and intersections for railways.....	Cwt. 28,692	143,781	17,582	74,527
Tubing:—				
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, over 4" diameter, N.O.P.....	\$	371,795	"	245,238
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, 4" and less in diameter, N.O.P.....	"	321,982	"	212,283
Seamless steel tubing, valued at not less than 5½ cents per lb.....	Cwt. 5,331	29,942	4,102	24,237
Rolled or drawn square tubing of iron or steel, adapted for use in the manufacture of agricultural implements.....	\$	7,884	"	4,636
Iron or steel pipe or tubing, plain or galvanized, riveted, corrugated or otherwise specially manufactured, including lockjoint pipe, N.O.P.....	"	221,140	"	167,803
Iron or steel pipe, not butt or lap welded, and wire bound wooden pipe, not less than 30" internal diameter, when for use exclusively in alluvial gold mining.....	"	130,265	"	16,850
Ware—Agate, granite, or enamelled iron or steel ware.....	"	113,407	"	122,418
Ware—Iron or steel hollow ware, plain black or coated, N.O.P., and nickel and aluminum kitchen or household hollow ware.....	"	34,217	"	20,908
Wire bale ties.....	"	685	"	5,635
Wire bound wooden pipe, N.O.P.....	Bundles of 250 ties 629	29	4,541	"

Wire cloth or woven wire and netting of iron or steel.....	Lbs.	1,559,650	85,769	1,378,974	74,422
Wire, crucible cast steel, valued at not less than 6 cents per lb.....	"	146,064	23,889	77,410	14,964
Wire screens, doors, and windows.....	\$	.....	7,377	.....	5,864
Wire buckthorn strip fencing, woven wire fencing, and wire fencing of iron and steel, N.O.P., not to include woven wire or netting made from wire smaller than No. 14 gauge, not to include fencing or wire larger than No. 9 gauge.....	Lbs.	1,969,592	57,924	1,363,438	45,513
Wire, single or several, covered with cotton, linen, silk, rubber, or other material, including cable so covered.....	"	2,237,772	442,416	1,674,448	277,662
Wire of iron and steel all kinds, N.O.P.....	"	11,099,983	310,090	4,723,315	136,628
Wire rope, stranded or twisted wire clothes lines, picture or other twisted wire, and wire cables, N.O.P.....	"	5,503,524	408,945	3,146,825	225,675
Iron or steel nuts, rivets, or bolts with or without threads, nut bolt, and hinge blank, and T and strap hinges of all kinds, N.O.P.....	Cwt.	48,555	199,218	23,962	88,248
Iron or steel scrap, wrought, being waste or refuse, including punchings, cuttings, and clippings of iron or steel plates or sheets having been in actual use : crop ends of tin plate bars, blooms, and rails, the same not having been in actual use.....	"	656,501	506,698	220,444	140,875
Penknives, jack-knives, and pocket knives of all kinds.....	"	.....	131,597	.....	102,973
Knives and forks of steel, plated or not, N.O.P.....	"	.....	318,820	.....	167,175
All other cutlery, N.O.P.....	"	.....	496,726	.....	357,603
Guns, rifles including air guns and air rifles (not being toys), muskets, cannons, pistols, revolvers, or other firearms.....	"	.....	630,449	.....	446,911
Bayonets, swords, fencing foils, and masks.....	"	.....	4,583	.....	7,680
Needles of any material or kind, N.O.P.....	"	.....	95,343	.....	69,460
Steel, chrome steel.....	"	4,871	21,785	3,057	13,947
Steel plate, universal mill or rolled edge plates of steel over 12" wide, imported by manufacturers of bridges or of structural work, or for use in car construction.....	Cwt.	269,118	415,686	265,356	370,650
Steel in bars or sheets to be used exclusively in the manufacture of shovels when imported by the manufacturers of shovels.....	"	25,227	48,063	17,089	25,022
Rolled iron or steel, or cast steel in bars, bands, hoops, scroll or strip, sheet or plate of any size, thickness or width, galvanized or coated with any material or not, and steel blanks for the manufacture of milling cutters, when of greater value than $\frac{3}{4}$ cts. per pound.....	"	74,796	494,585	41,848	263,662
Steel balls adapted for use in bearings of machinery and vehicles.....	"	.....	13,718	.....	11,474
Steel wool.....	"	387	1,584	208	2,025
Tools and implements—	Cwt.	.....	.....	.....	.....
Adzes, cleavers, hatchets, wedges, sledges, hammers, crowbars, cant-dogs and track tools, picks, mattocks and eyes or poles for the same.....	\$	.....	76,797	.....	47,575
Axes.....	Doz.	.....	35,383	.....	26,597
Saws.....	\$	5,730	181,750	4,392	73,058
Files and rasps, N.O.P.....	"	.....	87,046	.....	76,581
Tools, hand or machine, of all kinds, N.O.P.....	"	.....	1,017,391	.....	682,014
Knife blades or blanks, and table forks of iron and steel, in the rough, not handled, filed, ground or otherwise manufactured.....	"	.....	202	.....	.....
Manufactures, articles or wares of iron and steel, or of which iron and steel (or either) are the component materials of chief value, N.O.P.....	"	.....	3,980,631	.....	3,324,920
Totals.....	"	.....	51,485,456	.....	33,083,397

IRON.—TABLE 20.

## Imports of Iron and Steel Goods free of Duty.

Material.	Twelve months ending March, 1908.		Twelve months ending March, 1909.	
	Quantity.	Value.	Quantity.	Value.
Anchors for vessels	Cwt.	\$		\$
Chain, malleable sprocket or link belting		24,488	5,914	22,528
Cream separators, and steel bowls for		185,416		153,883
Cream separators—materials which enter into the construction and form part of when imported by manufacturers of cream separators to be used in the manufacture thereof		448,569		547,990
Gas buoys—The following articles and materials, when imported by manufacturers of such automatic gas buoys and automatic gas beacons, for use in the manufacture of such buoys and beacons for the Government of Canada or for export, viz., iron or steel tubes over 16" diameter, flanged and dished steel heads made from boiler plate, over 5 feet in diameter; hardened steel balls, not less than 3" diameter; acetylene gas lanterns and parts thereof, and robin bronze in bars or rods.		136,476		212,172
Iron or steel rods not less than $\frac{5}{16}$ " diameter for manufacturing of chain	Cwt.	200,054		23,229
Iron or steel, rolled round wire rods, in the coil, not over $\frac{3}{8}$ " diameter, when imported by wire manufacturers for use in making wire in the coil in their own factories			10,740	14,510
Boiler plate of iron or steel not less than 30" width, and not less than $\frac{1}{4}$ " thickness, for use exclusively in the manufacture of boilers	197,247	295,122	406,241	538,378
Flat galvanized iron or steel sheets	262,819	460,423	160,273	244,476
Rolled iron and steel, and cast steel in bars, band, hoop, scroll or strip, sheet or plate of any size, thickness or width, galvanized or coated with any material or not, and steel blanks for the manufacture of milling cutters, when of greater value than 3½ cts. per lb.	281,850	942,880	221,224	697,466
Rolled iron or steel sheets in strips, polished or not, 14 gauge and thinner, N. O. P.	61,243	441,416	39,000	264,739
Rolled iron or steel, hoop, band, scroll or strip, No. 14 gauge and thinner, galvanized or coated with other metal or not, N. O. P.	376,944	960,765	292,219	647,232
Iron tubing for manufacture of extension rods for windows	22,230	47,878	11,775	20,059
Iron or steel, beams, sheets or plates, ankles, knees, masts or parts thereof, and cable chains for wooden, iron, steel or composite ships or vessels				3,441
Locomotive and car wheel tires of steel in the rough	173,520	302,351	162,532	257,783
Scrap iron and scrap steel, old, and fit only to be re-manufactured, being part of or recovered from any vessel wrecked in waters subject to the jurisdiction of Canada	148,525	341,727	105,882	274,722
	200,340	176,518		



# Machinery:—

Articles of metal as follows, when for use exclusively in mining and metallurgical operations viz., coal cutting machines, except percussion coal cutters; coal heading machines; coal augers; rotary coal drills; miners safety lamps and parts thereof, also accessories for cleaning, filling, and testing such lamps; electric or magnetic machines for separating or concentrating iron ores; furnaces for the smelting of copper, zinc, and nickel ores; converting apparatus for metallurgical processes in metals; copper plates, plated or not; machinery for extraction of precious metals by the chlorination or cyanide process; amalgam safes; automatic ore samplers; automatic feeders; retorts; mercury pumps; pyrometers; bullion furnaces; amalgam cleaners; blast furnace blowing engines; wrought iron tubing, butt or lap welded, threaded or coupled, or not, over 4" diameter; and integral parts of all machinery mentioned in this item.

Blowers of iron or steel of a class or kind not made in Canada, for use in the smelting of ores, or in the reduction, separation or refining of metals; rotary kilns, revolving roasters and furnaces of metal of a class or kind not made in Canada, designed for roasting ore, mineral rock or clay; furnace slag trucks and slag pots of a class or kind not made in Canada.

Appliances of iron or steel, of a class or kind not made in Canada, and elevators and machinery of floating dredges, when for use exclusively in alluvial gold mining.

Well-drilling, and apparatus of a class or kind not made in Canada for drilling for water, natural gas or oil, and for prospecting for minerals, not to include motive power.

Briquette making machines.

Newspaper printing presses, of not less value by retail than \$1,500 each, of a class or kind not made in Canada.

Machinery and tools not manufactured in Canada up to the required standard necessary for any factory to be established in Canada for the manufacture of rifles for the Government of Canada.

All materials, or parts in the rough, unfinished, and screws, nuts, bands, and springs to be used in rifles to be manufactured at any such factory for the Government of Canada.

Machinery of every kind, and structural iron and steel for use in the construction and equipment of factories for the manufacture of sugar from beet root.

Mould boards or shares, or plough plates, land slides, and other plate for agricultural implements, when cut to shape from rolled plates of steel, but not moulded, punched, polished or otherwise manufactured.

Steel balls adapted for use on bearings on machinery, and vehicles.

Steel, rolled, for saws and straw cutters not tempered, or ground, nor further manufactured than cut to shape without indented edges.

Steel strips, and flat steel wire when imported into Canada by manufacturers of buckthorn and plain strip fencing, for use exclusively in their own factories in the manufacture thereof.

Steel wire, Bessemer soft drawn spring of Nos. 10, 12, and 13 gauge, respectively, and homo-facturers of wire mattresses, to be used exclusively in their own factories in the manufacture of such articles.

Steel, crucible sheet, 11 to 16 gauge, 2½" to 18" wide, for the manufacture of mower and reaper knives when imported by manufacturers thereof for use exclusively in the manufacture of such articles in their own factories.

facture of such articles in their own factories.

\$	1,060,945	520,757
"	47,687	13,410
"	415,930	269,407
"	165,638	61,380
"	10,130	702
No.	361,278	172,384
\$	5,678	4,938
"	15,148	14,720
"	25,804	12,317
Cwt.	69,851	144,288
	4,409	2,326
Cwt.	18,115	96,305
"	871	109
"	188	28
"	9,294	15,565
"	11,433	50,726
	49,779	12,033

IRON.—TABLE 20.—Continued.  
Imports of Iron and Steel Goods free of Duty.

Material.	Twelve months ending March, 1908.		Twelve months ending March, 1909.	
	Quantity.	Value.	Quantity.	Value.
Steel No. 20 gauge and thinner, but not thinner than No. 30 gauge, for the manufacture of corset steels, clock springs, and shoe shanks, imported by manufacturers of such articles for exclusive use in the manufacture of such articles in their own factories.....	208	\$ 1,228		\$
Steel wire, flat, of 16 gauge or thinner, imported by the manufacturers of crinoline, and corset wires and dress stays, for use exclusively in the manufacture of such articles in their own factories.....	3,765	24,631	4,094	26,495
Steel, No. 12 gauge and thinner, but not thinner than No. 30 gauge, for the manufacture of buckle clasps, bed fasts, furniture casters, and ice-creepers, imported by the manufacturers of such articles, for use exclusively in the manufacture of such articles in their own factories.....	1,520	4,245	1,631	4,385
Steel No. 24 and 17 gauge, in sheets 63" long and from 18" to 32" wide, when imported by the manufacturers of tubular bow sockets for use exclusively in the manufacture of such articles in their own factories.....	2,327	5,832		
Steel springs for the manufacture of surgical trusses, when imported by manufacturers of surgical trusses for use exclusively in the manufacture thereof in their own factories. Lbs.	969	706	906	774
Swedish rolled iron, and Swedish rolled steel nail rods, under half an inch in diameter, for the manufacture of horse shoe nails.....	22,360	44,168	18,520	39,002
Steel seamless tubing valued at not less than 3½ cents per pound.....	1,000	10,465	380	2,233
Steel or iron tubes, rolled, not joined or welded, not more than 1½" diameter, N. O. P.....		10,423		7,181
Seamless steel, or wrought iron boiler tubes, including flues and corrugated tubes for marine boilers.....		655,203		415,068
Barbed fencing wire of iron or steel.....	241,520	572,766	231,627	567,236
Wire, crucible cast steel, valued at not less than 6 cents per lb.....	14,340	2,765	10,588	1,830
Wire, curved or not, galvanized iron or steel, Nos. 9, 12, and 13 gauge.....	608,039	1,341,416	399,506	858,129
Wire, steel, valued at not less than 2½ cents per pound when imported by manufacturers of rope for use exclusively in the manufacture of rope.....	35,460	142,467	22,120	85,714
Totals.....		10,394,242		7,376,034

## LEAD.

The production of lead in Canada in 1909 was entirely from British Columbia mines.

Hitherto the statistics given have been those collected and published by the Provincial Mineralogist for that Province. The figures given for 1909 are, however, based on direct smelter returns, and the quantities represent the amount of lead exported in base bullion or refined in Canada, and shipped as pig lead or manufactured products, and thus represent the actual recovery.

The production for 1909 shows an increase over 1908, the total amount being 45,857,424 pounds, against 43,195,733 for the previous year.

In valuing the lead production for 1909, the average price per pound at Toronto has been used in place of the average price at New York. The price at Toronto is lower than that at New York and higher than that at London, and is probably a more equitable valuation to place upon the Canadian production. The New York market is practically closed to Canadian lead by high tariff, and to the London market price must be added the freight, etc., to reach the Canadian market.

Statistics showing the lead production since 1887 are given in the following table:—

LEAD.—TABLE 1.

Annual Production.

Calendar Year.	Lbs.	Price per Lb.	Value.	Calendar Year.	Lbs.	Price per Lb.	Value.
		Cts.	\$			Cts.	\$
1887.....	204,800	4 500	9,216	1899.....	21,862,436	4 470	977,250
1888.....	674,500	4 420	29,812	1900.....	63,169,821	4 370	2,760,521
1889.....	165,100	3 930	6,488	1901.....	51,900,958	4 334	2,249,387
1890.....	105,000	4 480	4,704	1902.....	22,956,381	4 069	934,095
1891.....	88,665	4 350	3,857	1903.....	18,139,283	4 237	768,562
1892.....	808,420	4 090	33,064	1904.....	37,531,244	4 309	1,617,221
1893.....	2,135,023	3 730	79,636	1905.....	56,864,915	4 707	2,676,632
1894.....	5,703,222	3 290	187,636	1906.....	54,608,217	5 657	3,089,187
1895.....	16,461,794	3 230	531,716	1907.....	47,738,703	5 325	2,542,086
1896.....	24,199,977	2 980	721,159	1908.....	43,195,733	4 200	1,814,221
1897.....	39,018,219	3 580	1,396,853	1909.....	45,857,424	3 690	1,692,139
1898.....	31,915,319	3 780	1,206,399				

Previous to 1904, lead ores mined in Canada were either exported as ore or smelted in Canadian furnaces and exported in the form of base bullion, to be refined abroad. A lead refinery employing the Bett's Electrolytic process is now operated at Trail, B.C., in connexion with the smelter there, and has witnessed frequent enlargements, until it is now treating the base bullion produced from

the treatment of practically all the British Columbia lead ores, by the Trail smelter. Pig lead, fine gold, fine silver, refined antimony, copper sulphate, and babbitt metal, are produced at the refinery, and lead pipe also is manufactured there.

The production of refined lead, including pig lead and lead pipe, etc., has been as follows:—

	Refined lead produced.
1904.....	7,519,440
1905.....	15,804,509
1906.....	20,471,314
1907.....	26,607,461
1908.....	36,549,274
1909.....	41,883,614

The refined lead finds a market in Canada, the United States, and the Orient. Of that in Canada, a great part is consumed in the manufacture of white lead, for which the Trail product is especially valuable on account of its purity. The Carter White Lead Company of Canada, with works at Montreal, uses Trail lead exclusively.

*Prices.*—The average price of lead in the New York market during 1907 was 5.325 cents per pound; in 1908 it fell to 4.200 cents, a decrease of 1.125 cents or 21.1 per cent, and in 1909 it rose to 4.273 cents, an increase of 0.073 cents or 1.7 per cent.

In British Columbia, payments for the lead in ores purchased by the smelters are made on the basis of the London market price, since it is on that basis that bounty payments are made, and in competition with that market that the products are sold.

The price of lead in London averages from  $\frac{1}{2}$  to 2 cents per pound lower than in New York.

The average price for soft lead in 1909 was £13 1s 8d (equivalent to 2.803 cents per pound) per long ton, as compared with £13 10s 5d (2.897 cents per pound) in 1908, and £19 1s 10d (4.090 cents per pound) in 1907.

In Toronto and Montreal lead is sold at a price intermediate between the New York and London values, the average price per pound in Toronto in 1909 being quoted as 3.690 cents per pound, as compared with 3.894 cents per pound in 1908 and 5.429 cents per pound in 1907.



The monthly and yearly average prices of lead in New York, London, and Toronto for the past ten years are given in the following tables:—

**Average Monthly Prices of Lead in New York—in cents per pound.**

Month.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.
January.....	4·68	4·35	4·000	4·075	4·347	4·552	5·600	6·000	3·691	4·175
February.....	4·68	4·35	4·075	4·075	4·375	4·450	5·464	6·000	3·725	4·018
March.....	4·68	4·35	4·075	4·442	4·475	4·470	5·350	6·000	3·838	3·986
April.....	4·68	4·35	4·075	4·567	4·475	4·500	5·404	6·000	3·993	4·168
May.....	4·18	4·35	4·075	4·325	4·423	4·500	5·685	6·000	4·253	4·287
June.....	3·90	4·35	4·075	4·210	4·196	4·500	5·750	5·760	4·466	4·350
July.....	4·03	4·35	4·075	4·075	4·192	4·524	5·750	5·288	4·447	4·321
August.....	4·25	4·35	4·075	4·075	4·111	4·665	5·750	5·250	4·580	4·363
September.....	4·35	4·35	4·075	4·243	4·200	4·850	5·750	4·813	4·515	4·342
October.....	4·35	4·35	4·075	4·375	4·200	4·850	5·750	4·750	4·351	4·341
November.....	4·58	4·35	4·075	4·218	4·200	5·200	5·750	4·376	4·330	4·370
December.....	4·35	4·15	4·075	4·162	4·600	5·422	5·900	3·658	4·213	4·560
Average.....	4·37	4·33	4·069	4·237	4·309	4·707	5·657	5·325	4·200	4·273

The average monthly prices of soft lead in London, England, as published by Julius Matton of London, and Metallgesellschaft of Frankfort-on-the-Main, were, from 1900 to 1909, as follows:—

**Average Monthly Prices of Lead in London—£ per long ton.**

Month.	1900.			1901.			1902.			1903.			1904.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January.....	16	5	11	15	18	6	10	11	4	11	6	1	11	11	2
February.....	16	10	10	14	13	4	11	12	4	11	14	2	11	11	10
March.....	16	12	3	13	7	7	11	10	2	13	4	6	12	—	9
April.....	16	14	8	12	8	5	11	11	11	12	8	1	12	5	1
May.....	16	18	—	12	5	6	11	12	—	11	16	—	11	15	11
June.....	17	4	6	12	6	10	11	5	5	11	8	9	11	10	5
July.....	17	10	8	12	3	—	11	4	8	11	7	8	11	13	4
August.....	17	12	8	11	13	10	11	2	5	11	2	11	11	14	9
September.....	17	13	4	11	19	1	10	17	10	11	3	4	11	15	9
October.....	17	11	11	11	12	—	10	14	11	11	2	2	12	3	9
November.....	17	4	7	11	5	4	10	14	4	11	2	2	12	17	10
December.....	16	4	8	10	10	8	10	15	1	11	3	7	12	15	6
Yearly average.....	16	19	9	12	10	5	11	5	3	11	11	7	11	19	8

Month.	1905.			1906.			1907.			1908.			1909.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January....	12	17	6	16	17	6	19	16	8	14	10	6	13	3	6
February....	12	9	3	16	0	4	19	11	6	14	5	6	13	5	5
March.....	12	5	11	15	17	9	19	14	7	14	1	4	13	8	8½
April.....	12	13	2	15	16	6	19	16	4	13	13	10	13	7	—
May.....	12	15	3	16	13	6	19	17	7	13	2	7	13	5	3
June.....	13	—	—	16	15	6	20	6	—	12	15	7	13	2	4
July.....	13	12	2	16	11	7	20	8	2	12	19	6	12	13	3
August.....	13	19	2	17	1	3	19	5	3	13	9	10½	12	10	6
September....	13	19	—	18	4	4	19	17	6	13	3	6	12	15	3
October.....	14	13	7	19	7	9	18	13	—	13	7	3	13	4	4
November.....	15	6	9	19	5	6	17	4	11	13	12	2	13	1	4½
December.....	17	1	—	19	12	6	14	9	4	13	3	6	13	2	11½
Yearly average...	13	14	5	17	7	—	19	1	10	13	10	5	13	1	8

**Price of Pig Lead at Toronto—cents per pound on the first market day of each month.**

Month.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.
January.....	4·875	4·875	3·625	3·500	3·300	3·600	4·800	5·400	4·250	3·750
February.....	4·875	4·875	3·625	3·500	3·300	3·800	4·800	5·400	4·500	3·800
March.....	4·875	4·875	3·625	3·500	3·300	3·550	4·800	5·875	4·125	3·750
April.....	5·625	4·875	3·625	3·500	3·300	3·625	4·400	5·550	4·000	3·750
May.....	5·125	4·375	3·625	3·500	3·300	3·800	4·400	5·550	4·000	3·750
June.....	5·125	4·375	3·625	3·500	3·250	3·800	4·400	5·450	3·750	3·650
July.....	5·125	4·375	3·625	3·500	3·250	3·800	4·500	5·550	3·600	3·650
August.....	5·125	4·375	3·625	3·500	3·250	4·000	4·350	5·500	3·600	3·600
September....	5·125	4·375	3·500	3·500	3·250	4·000	4·600	5·250	3·600	3·600
October.....	5·125	4·125	3·250	3·500	3·500	4·000	4·950	5·500	3·750	3·650
November.....	5·125	4·250	3·500	3·375	3·500	4·100	5·500	5·500	3·750	3·650
December.....	4·875	4·125	3·500	3·300	3·600	4·100	5·250	4·625	3·800	3·700
Average.....	5·083	4·489	3·562	3·473	3·342	3·848	4·727	5·429	3·894	3·690

*Bounties.*—In 1901, and again in 1903, the Dominion Government, to encourage the lead industry, authorized the payment of a bounty on the production of lead. The act of 1903 provided for the payment under certain restrictions of 75 cents per hundred pounds on lead contained in ore mined and smelted in Canada, provided that when the standard price of pig lead in London, England, exceeded £12 10s. per ton of 2,240 pounds, such bounty should be reduced proportionately by the amount of such excess. Thus, when the price of lead in London rose to £16 or over per long ton, the bounty ceased. As the price of lead exceeded £16 sterling on the London market for a considerable period during 1906 and 1907 the bounty paid during those years was comparatively small.

The act of 1903 provided that payment of bounty should cease on June 30, 1908, and as only a portion of the funds provided had been used, a new act was passed in the latter year providing for further bounty payments at the rate of

75 cents per hundred pounds, or approximately £3 10s. per ton of 2,240 pounds, subject to the restriction that when the price of lead in London exceeds £14 10s. the bounty shall be reduced by such excess.

The act, together with the regulation based upon it, is reproduced herewith in full.

‘ACT 7-8 EDWARD VII, CHAPTER 43.

AN ACT RESPECTING THE PAYMENT OF BOUNTIES ON LEAD CONTAINED IN LEAD-BEARING ORES MINED IN CANADA.

*Assented to July 20th, 1908.*

Whereas under the provisions of an Act passed on the 24th day of October, 1903, being chapter 31 of the Acts of 1903, payment of a bounty on lead contained in lead-bearing ores mined in Canada, not to exceed five hundred thousand dollars in any fiscal year, was authorized to be paid until the thirtieth day of June, 1908; and whereas the total amount of bounty paid thereunder up to the thirty-first day of March, 1908, was six hundred and sixty-seven thousand four hundred and four dollars, and it is estimated that a further amount of forty-five thousand dollars will be payable on or before the thirtieth day of June, 1908, leaving unexpended about one million seven hundred and eighty-eight thousand and seventy-eight dollars of the total amount authorized to be paid under the provisions of the said chapter 31: Therefore His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. The Governor in Council may authorize the payment of a bounty of seventy-five cents per one hundred pounds on lead contained in lead-bearing ores mined in Canada, on and after the first day of July, 1908, such bounty to be paid to the producer or vendor of such ores: Provided that the sum to be paid as such bounty shall not exceed five hundred thousand dollars in any year ending on the thirtieth day of June: Provided also that when it appears to the satisfaction of the Minister charged with the administration of this Act that the standard price of pig lead in London, England, exceeds fourteen pounds ten shillings sterling per ton of two thousand two hundred and forty pounds, such bounty shall be reduced by the amount of such excess.

2. The total amount of bounty payable under the provisions of chapter 31 of the Acts of 1903, and of this Act, shall not exceed two million five hundred thousand dollars.

Payment of the said bounty may be made from time to time to the extent of sixty per cent upon smelter returns showing that the ore has been delivered for smelting at a smelter in Canada. The remaining forty per cent may be paid at the close of the fiscal year, upon evidence that all such ore has been smelted in Canada.

If at the close of any year it appears that during the year the quantity of lead produced, on which the bounty is authorized, exceeds thirty-three thousand three hundred and thirty-three tons of two thousand pounds, the rate of bounty

shall be reduced to such sum as will bring the payments for the year within the limit mentioned in section 1.

3. If at any time it appears to the satisfaction of the Governor in Council that the charges for transportation and treatment of lead ores in Canada are excessive, or that there is any discrimination which prevents the smelting of such ores in Canada on fair and reasonable terms, the Governor in Council may authorize the payment of bounty at such reduced rates as he deems just, on the lead contained in such ores mined in Canada and exported for treatment abroad.

4. If at any time it appears to the satisfaction of the Governor in Council that products of lead are manufactured in Canada direct from lead ores mined in Canada without the intervention of the smelting process, the Governor in Council may make such provision as he deems equitable to extend the benefits of this Act to the producers of such ores.

5. The bounties payable under the provisions of this Act shall cease and determine on the thirtieth day of June, one thousand nine hundred and thirteen.

6. The Governor in Council may make regulations for carrying out the intention of this Act.

REGULATIONS under the provisions of the Act 7-8, Edward VII, Chapter 43 intituled 'An Act to provide for the payment of Bounty on Lead contained in the lead-bearing ores mined in Canada.'

*(As authorized by Order in Council on the 3rd August, 1908).*

1. The Minister of Trade and Commerce is charged with the administration of this Act.

2. All producers or vendors of lead-bearing ores who desire to avail themselves of the provisions of the Act above quoted, and to be paid bounty, shall, before making claim for such bounty, notify the Minister of their intention to claim under the provisions of the Act, and shall declare the name of the mine producing such ore, its situation, the names of the President, Secretary, and Manager, as well as the name of the official authorized to make claim. Notice shall be given the Minister of changes in ownership and management. Where the bounty is claimed by Lessees, the consent of the owner shall be shown.

3. All claims for the payment of bounty shall be made and substantiated under the oath of the Manager of the mine, or of the official authorized to make the claim.

4. Claims may be made monthly, that is immediately after the close of each calendar month, and be in such form and contain such evidence as may seem to the Minister from time to time necessary.

5. No claims made otherwise than in conformity with these regulations, and in form required by the Minister, shall be recognized, allowed or paid by the Minister.

6. The smelting of all such ores shall at all times be under the supervision of the officer of the Department of Trade and Commerce appointed or detailed for the purpose.



7. The supervising officer may at any time demand and receive a portion of the floor sample of any ore delivered at the smelter for smelting purposes.

8. The rate of bounty shall be computed according to the London quotation upon the day the ore is taken into stock at the smelter, such day not to be later than the last day of the calendar month during which the ore was unloaded from cars at the smelter grounds.

9. The lead contents of ores shall for the purpose of this Act be ascertained by fire assay, as used in ordinary commercial assaying.

10. The books of the claimants, and those of the smelting works at which the ore is smelted, shall be at all times open to the inspection of such supervising officer, and of any officer of the Department of Trade and Commerce who may be detailed by the Minister for the purpose.

11. All claims shall be substantiated by the oath of the Manager of the Smelting Works at which the ores are smelted, and shall be verified and certified to by the officer of the Department of Trade and Commerce appointed to supervise the smelting at the works where it has been carried on.

12. The cost of the supervision shall be paid by the claimants and may be deducted *pro rata* according to the quantity smelted during the fiscal year from the amount payable to such claimants at the close of each fiscal year.'

#### Statement of Bounties Paid on Lead during the Fiscal Years 1899 to 1910.

Year ending.	Bounty paid.	Year ending.	Bounty paid.
	\$		\$
June 30, 1899. ....	76,665	June 30, 1906. ....	30,196
" 30, 1900. ....	43,335	March 31, 1907, (9 months).....	1,995
" 30, 1901. ....	30,000	" 31, 1903. ....	51,001
" 30, 1902. ....		" 31, 1909. ....	307,433
" 30, 1903. ....	4,380	" 31, 1910. ....	340,542
" 30, 1904. ....	195,627		
" 30, 1905. ....	330,645	Total. ....	1,471,819

Exports and Imports: According to Trade and Navigation reports the total quantity of lead contained in ore, or concentrates, or pig lead, exported during the calendar year 1909, was 17,528,028 pounds valued at \$493,642, as compared with 18,454,594 pounds valued at \$622,454 in 1908.

Details of exports 1907 to 1909 are as follows:—

**Exports of Lead 1907, 1908, and 1909.**

	Lead in Ore, Concentrates, etc.		Pig Lead.	
	Lbs.	Value.	Lbs.	Value.
1907		\$		\$
To United States.....	13,817,389	532,235	4,590	230
To other countries.....	8,160,788	333,706	3,609,116	163,727
Totals.....	21,978,177	865,941	3,613,706	163,957
1908				
To United States.....	719,086	20,514	168,866	5,329
To other countries.....	3,792,845	132,880	13,773,797	463,731
Totals.....	4,511,931	153,394	13,942,663	469,060
1909				
To United States.....	6,096,852	126,478	280	8
To other countries.....	129,216	6,100	11,301,680	361,056
Totals.....	6,226,068	132,578	11,301,960	361,064

The exports of lead since 1873 are shown in Table 2.

**LEAD.—TABLE 2.**

**Exports of Lead.**

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1873.....		1,993	1892.....		2,509
1874.....		127	1893.....		3,099
1875.....		7,510	1894.....	5,792,700	144,509
1876.....		66	1895.....	23,075,892	435,071
1877.....		720	1896.....	26,480,320	462,095
1878.....			1897.....	43,802,697	925,144
1879.....		230	1898.....	37,375,678	885,485
1880.....			1899.....	15,799,518	466,950
1881.....			1900.....	57,642,029	1,917,690
1882.....		32	1901.....	45,590,995	1,804,687
1883.....		5	1902.....	17,761,484	457,170
1884.....		36	1903.....	18,624,303	426,466
1885.....			1904.....	25,868,823	559,461
1886.....			1905.....	41,657,403	1,046,541
1887.....		724	1906.....	21,436,022	736,007
1888.....		18	1907.....	25,591,883	1,029,898
1889.....		18	1908.....	18,454,594	622,454
1890.....			1909.....	17,528,028	493,642
1891.....		5,000			

Statistics of the annual imports since 1880 of lead and manufactures of lead are shown in Tables 3 and 4; imports of litharge in Table 5; and imports of dry white and red lead in Table 6.

The principal imports during the fiscal years 1908 and 1909, and calendar year 1909, were as follows:—

	1908 (Fiscal).		1909 (Fiscal).		1909 (Calendar).	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
Old, scrap, pig, and block.....	3,196	284,604	2,506	151,173	5,649	184,572
Bars and sheets.....	862	75,186	688	46,093	671	44,073
Pipe.....	125	11,783	157	8,844	71	4,884
Shot and bullets.....	11	1,221	5	482	5	489
Manufactures of lead .....		112,287		94,506		102,370
Tea lead.....	1,081	118,635	1,168	109,335	1,113	116,461
Litharge.....	952	90,785	606	43,597	852	58,100
Total.....	6,227	694,501	5,130	454,030	7,822	454,030
Metallic lead contained in imported lead pigments.....	3,111	.....	1,874	.....	1,514	.....
	9,338	.....	7,004	.....	9,336	.....

LEAD.—TABLE 3.

## Imports of Lead.

Fiscal Year.	OLD, SCRAP, AND PIG.		BARS, BLOCKS, SHEETS.		TOTAL.	
	Cwt.	Value.	Cwt.	Value.	Cwt.	Value.
		\$		\$		\$
1880.....					30,298	124,117
1881.....	16,236	56,919	18,222	70,744	34,458	127,663
1882.....	36,655	120,870	10,540	35,728	47,195	156,598
1883.....	48,780	148,759	8,591	28,785	57,371	177,544
1884.....	39,409	103,413	9,704	28,458	49,113	131,871
1885.....	36,106	87,038	9,362	24,396	45,468	111,434
1886.....	39,945	110,947	9,793	28,948	49,738	139,895
1887.....	61,160	173,477	14,153	41,746	75,313	215,223
1888.....	68,678	196,845	14,957	45,900	83,635	242,745
1889.....	74,223	213,132	14,173	43,482	88,396	256,614
1890.....	101,197	283,096	19,083	59,484	120,280	342,580
1891.....	86,382	243,033	15,646	48,220	102,028	291,253
1892.....	97,375	254,384	11,299	32,368	108,674	286,752
1893.....	94,485	215,521	12,403	32,286	106,888	247,807
1894.....	70,223	149,440	8,486	20,451	78,709	169,891
1895.....	67,261	139,290	6,739	16,315	74,000	155,605
1896.....	72,433	173,162	8,575	23,169	81,008	196,331
1897.....	65,279	158,381	10,516	29,175	75,795	187,556

	OLD, SCRAP, FIG. AND BLOCK.*		BARS AND SHEETS.†		TOTAL.	
	\$		\$		\$	
1893.....	88,420	260,779	22,214	39,041	110,634	299,820
1899.....	114,659	288,432	44,796	39,833	159,455	323,265
1900.....	62,361	207,819	15,493	53,506	77,854	251,325
1901.....	(a) 85,321	97,011	16,295	78,316	101,616	175,327
1902.....	(a) 122,279	104,672	18,596	49,261	140,875	153,933
1903.....	(a) 98,530	67,821	11,535	35,398	110,065	103,219
1904.....	(a) 94,602	121,165	14,102	39,644	108,704	160,809
1905.....	(a) 57,074	133,775	17,792	51,972	74,866	185,747
1906.....	82,729	271,105	16,106	57,185	98,835	328,290
1907.....	79,575	277,470	13,710	56,630	93,285	334,100
1908.....	63,921	284,604	17,253	75,186	81,174	359,790
1909.....	50,110	151,173	13,754	46,093	63,864	197,266

\* Duty 15 per cent.

† Duty 25 per cent.

(a) Includes Canadian lead ore sent to the United States for refining, imported at price of refining only.

LEAD.—TABLE 4.  
Imports of Lead Manufactures.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	15,400	1890.....	25,600	1900.....	194,736
1881.....	22,629	1891.....	23,893	1901.....	107,260
1882.....	17,282	1892.....	22,636	1902.....	120,020
1883.....	25,556	1893.....	33,783	1903.....	134,151
1884.....	31,361	1894.....	29,361	1904.....	129,093
1885.....	36,340	1895.....	38,015	1905.....	147,177
1886.....	33,078	1896.....	50,722	1906.....	163,793
1887.....	19,140	1897.....	60,735	1907.....	162,425
1888.....	18,816	1898.....	63,179	1908.....	243,926
1889.....	16,315	1899.....	91,497	1909.....	213,167

NOTE—In this table the following items are included under the heading of manufactures, viz., pipe, shot and bullets, tea-lead and manufactures N.O.P.

LEAD.—TABLE 5.  
Imports of Litharge.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$			\$
1880.....	3,041	14,334	1890.....	9,453	31,401	1900.....	9,139	29,176
1881.....	6,126	22,129	1891.....	7,979	27,613	1901.....	11,132	51,944
1882.....	4,900	16,651	1892.....	10,384	34,343	1902.....	13,002	47,021
1883.....	1,532	6,173	1893.....	7,685	24,401	1903.....	13,921	47,761
1884.....	5,235	18,132	1894.....	38,547	28,685	1904.....	9,894	32,633
1885.....	4,990	16,156	1895.....	11,955	32,953	1905.....	17,865	57,736
1886.....	4,928	16,003	1896.....	10,710	32,817	1906.....	10,165	39,836
1887.....	6,397	21,865	1897.....	12,028	34,538	1907.....	11,311	49,183
1888.....	7,010	23,808	1898.....	11,446	32,904	1908 Duty free	19,052	90,785
1889.....	8,089	31,082	1899.....	9,530	32,518	1909.....	12,117	43,597



The production of refined lead, as already shown, was, in 1909, 20,942 tons; while the exports of pig lead were 5,859 tons, leaving 15,283 tons as the consumption of Canadian lead. The imports of lead during the calendar year 1909 are shown above to have been 9,336 tons, not including certain manufactures of lead valued at \$102,370, so that the total consumption of lead in 1909 probably exceeded 25,000 tons.

The imports of white and red lead and orange mineral in 1909 amounted to 3,936,608 pounds, valued at \$153,913. In 1903 the imports were 19,208,786 pounds, the falling off being due to the establishment of corroding works at Montreal. Detailed statistics of imports of lead pigments in 1908 and 1909 are as follows, the statistics of imports since 1885 being shown in Table 6.

#### Imports of White and Red Lead in 1908 and 1909.

—	1908 (Fiscal Year).		1909 (Fiscal Year).		1909 (Calendar Year)	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
Lead, white dry.....	6,115,739	\$ 328,768	2,972,431	\$114,433	2,690,575	\$95,894
Lead, white ground in oil.....	513,179	28,443	481,317	21,810	730,001	32,678
Lead, red, dry and orange mineral.....	1,201,942	63,326	1,233,668	59,015	516,032	25,341
	7,830,860	420,537	4,687,416	195,258	3,936,608	153,913

LEAD.—TABLE 6.

#### Imports of Dry White and Red Lead and Orange Mineral, and White Lead ground in Oil.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1885.....	5,404,753	198,913	1898.....	12,682,808	448,659
1886.....	6,703,077	213,258	1899.....	14,507,945	514,842
1887.....	6,998,820	233,725	1900.....	14,679,920	634,492
1888.....	6,361,334	216,654	1901.....	10,241,601	461,368
1889.....	7,066,465	267,236	1902.....	15,584,164	603,582
1890.....	10,859,672	381,959	1903.....	19,208,786	758,371
1891.....	8,560,615	337,407	1904.....	16,925,585	662,098
1892.....	10,288,766	351,686	1905.....	17,376,588	638,381
1893.....	10,865,183	364,680	1906.....	10,412,891	417,444
1894.....	10,958,170	353,053	1907 (9 months).....	5,956,626	290,629
1895.....	8,780,052	282,353	1908.....	7,830,860	420,537
1896.....	11,711,496	367,569	1909.....	4,687,416	195,258
1897.....	10,310,463	347,539			

#### Nova Scotia.

Two companies have been engaged during the year in prospecting and doing development work for argentiferous galena, namely, The King Edward Exploration, Smelting, Refining, and Milling Company of Cape Breton, Limited, at rear of Boisdale, county of Cape Breton, and Bessie Dunbrack et al. near Musquodoboit in the county of Halifax. With regard to the former it is stated that the de-

posit so far opened in this shaft is from 2 to 7 feet in width, and in places shows much galena. The deposit is at the contact of the Carboniferous limestone with the conglomerate at the Musquodoboit property. At the present time work is being confined to a shaft 100 feet in depth sunk during the year on a pegmatite dike 3 to 7 feet in width, the course of which is nearly north and south, and dipping to the east at an angle of from 60 to 70 degrees. The dike, in addition to galena, carries chalcopryite and malachite.

### Ontario.

There was no production of lead reported from Ontario in 1909. The Canadian Lead Mining and Smelting Company, Limited, have not as yet done any work on their proposed smelter at Kingston.

### British Columbia.

As already stated all the production in 1909 was from British Columbia mines, and there was a distinct increase over the previous year as shown by Table 7, following:—

LEAD.—TABLE 7.

#### British Columbia:—Production.

Calendar Year.	Lbs.	Value.	Price per Pound.	Calendar Year.	Lbs.	Value.	Price per Pound.
		\$	Cts.			\$	Cts.
1887. ....	204,800	9,216	4 50	1899. ....	21,862,436	977,250	4 470
1888. ....	674,500	29,813	4 42	1900. ....	63,158,621	2,760,031	4 370
1889. ....	165,100	6,488	3 93	1901. ....	51,582,906	2,235,603	4 334
1890. ....	Nil.			1902. ....	22,536,381	917,005	4 069
1891. ....	"			1903. ....	18,089,283	766,443	4 237
1892. ....	808,420	33,064	4 09	1904. ....	36,646,244	1,579,086	4 309
1893. ....	2,131,092	79,490	3 73	1905. ....	56,580,703	2,663,254	4 707
1894. ....	5,703,222	187,636	3 29	1906. ....	52,408,217	2,964,733	5 657
1895. ....	16,461,794	531,716	3 23	1907. ....	47,738,703	2,542,086	5 325
1896. ....	24,199,977	721,159	2 98	1908. ....	43,195,733	1,814,221	4 200
1897. ....	38,841,135	1,390,513	3 58	1909. ....	45,857,424	1,692,139	3 690
1898. ....	31,693,559	1,198,017	3 780				

## LEAD.—TABLE 8.

British Columbia:—Production by Districts.<sup>1</sup>

	1905.	1906.	1907.	1908.	1909.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Cassiar.....	5,500				
East Kootenay—					
Fort Steele.....	48,248,828	44,487,481	37,526,194	30,204,788	27,004,528
Other districts.....	149,584	167,691	73,842	358,270	18,724
West Kootenay—					
Ainsworth.....	1,002,114	3,173,353	3,654,775	4,790,216	10,298,343
Nelson.....	1,368,388	1,034,553	1,582,113	345,424	1,097,069
Slocan.....	5,399,330	2,975,674	4,305,826	6,572,268	4,976,199
Other districts.....	339,883	469,000	570,534	903,552	979,916
Yale.....	67,076	100,465	25,419	21,215	21,567
	56,580,703	52,408,217	47,738,703	43,195,733	44,396,346

<sup>1</sup> From the Report of the Minister of Mines, B.C., 1909.

The increase in production was largely due to the operation of the Blue Bell mine in Ainsworth district, West Kootenay, which, next to the St. Eugene, was the most important producer of lead for the year. The renewal of and increase in the bounty had a noticeable effect in aiding the lower grade mines and removing the uncertainty with which the prospect of the continuance of the bounty on lead was regarded. In East Kootenay, the St. Eugene and the North Star produced the greater part of the ore. At the close of the year the announcement was made of the acquirement of a bond on the Sullivan mine at Kimberly by the Consolidated Mining and Smelting Company of Canada, Limited, the owners of the St. Eugene mine and the Trail smelter. This mine is one of the larger low grade properties, and has been worked with varying success in previous years, the ore being of a very complex and refractory nature.

In West Kootenay, the shippers of over 1,000 tons of ore or concentrates were the Blue Bell, Whitewater, Whitewater Deep, Van Roi, Richmond-Eureka, Silver Cup, and Emerald, the working of the Blue Bell being of special interest owing to the low grade of the ore.

In the Portland Canal district, no shipments are yet reported, but there are several mines in various stages of development, some of which may enter the list of shippers within the year.

## NICKEL.

The mining and metallurgical treatment of the nickel-copper ores of the Sudbury district of Ontario has become one of the most important of Canada's metal mining industries, and special interest is attached to this industry because of the fact that these deposits at the present time supply a very large portion of the world's demand for nickel, and also because the present known available supplies of ore in the district appear to be sufficient for many years' operations. Additional interest is now lent to these ores by the discovery of the valuable properties possessed by the new alloy of nickel and copper recently introduced to commerce under the name of monel metal, of which some particulars were given in last year's report.

These nickel-copper ore deposits have already been the subject of special reports by the Geological Survey at Ottawa, and the Ontario Bureau of Mines at Toronto,<sup>1</sup> to which reference may be made for comprehensive descriptions of the geology of the district.

The production of ore and its reduction to a bessemer matte was carried on during 1909 to a greater extent than in any previous year. There were mined during the year 451,892 tons of ore, much of which is subjected to open air heap roasting before being smelted. There were smelted 462,336 tons, from which were produced 25,845 tons of Bessemer matte, carrying approximately 13,141 tons of nickel and 7,873 tons of copper. The net value of the matte was returned as \$3,913,017. The matte, which is shipped to the United States and Great Britain for refining, carries from 77 to 82 per cent of the combined metals, having averaged for the past year 50.9 per cent in nickel and 30.5 per cent in copper.

For the production of monel metal a special matte is produced with contents of 22 per cent copper and 58 per cent nickel. There were about 2,800 tons of this matte produced during the past year, which is included in the total given above. Monel metal is produced from this special matte without the intermediate refining of either the nickel or copper.

Compared with 1908, there was an increase in matte production in 1909 of 4,648 tons or 21.9 per cent, and the increase in total nickel content of matte was 3,569 tons or 37.3 per cent. The total copper content of matte was 7,873 tons, an increase of 370 tons or 4.9 per cent over the previous year.

The following were the aggregate results of the operations on the nickel-copper deposits of Ontario during the past four years:—

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<sup>1</sup> No. 873. Report on Nickel and Copper Deposits of Sudbury, Ont., by A. E. Barlow, Geological Survey of Canada, 1901.

The Sudbury Nickel Region, by A. P. Coleman, Bureau of Mines, Vol. XIV, part III, 1904.



	1906. Tons of 2,000 lbs.	1907. Tons of 2,000 lbs.	1908. Tons of 2,000 lbs.	1909. Tons of 2,000 lbs.
Ore mined.....	343,814	351,916	409,551	451,892
Ore smelted.....	340,059	359,076	360,180	462,336
Bessemer matte produced.....	20,364	22,041	21,197	25,845
" " shipped.....	20,310	22,025	21,210	.....
Copper content of matte shipped....	5,265	6,996	7,503	7,873
Nickel " " ".....	10,745	10,595	9,572	13,141
Spot value of matte shipped.....	\$4,628,011	\$3,289,382	\$2,930,989	\$3,913,017
Wages paid.....	1,117,420	1,278,694	1,286,265	1,234,904
Men employed.....	1,417	1,660	1,690	1,573

According to Customs returns exports of nickel in matte, etc., were for twelve months ending December 31, as follows:—

	1906. Lbs.	1907. Lbs.	1908. Lbs.	1909. Lbs.
To Great Britain.....	2,716,892	2,518,338	2,554,486	3,843,763
To United States.....	17,936,953	16,857,997	16,865,407	21,772,635
	20,653,845	19,376,335	19,419,893	25,616,398

The above figures of production do not include the nickel content of the silver-cobalt ores from the Cobalt district, of which it is difficult to obtain complete statistics. The shippers of silver-cobalt ores receive no return for the nickel content, although this metal forms an important constituent of the ore and is possibly, to some extent, saved by the refiners. Preparations have been made by the Coniagas Reduction Company at Thorold, and the Deloro Mining and Reduction Company at Deloro, for the recovery of nickel oxide, but up to the end of 1909 operations had not passed the experimental stage.

The price of refined nickel in New York during 1909 was quoted at from 40 to 50 cents per pound, the quotations in December being 'large lots, contract business 40 to 45 cents per pound, retail spot from 50 cents for 2,000 pound lots up to 55 cents for 500 pound lots. The price for electrolytic is 5 cents higher.' During 1908 the price of refined nickel in New York was quoted during the first nine months at from 45 to 50 cents per pound and during the balance of the year at from 40 to 45 cents, according to size and terms of order.

Statistics of the quantities of nickel contained in matte produced are shown in the following table, the values being based on the final value of the metal in a refined state.

Statistics of the quantities of ore mined and smelted, matte produced, etc., will be found in the chapter on smelter production, pages 24, and 25.

NICKEL.—TABLE 1.  
Annual Production.

Calendar Year.	Pounds of Nickel in Matte Shipped.	Average Price per lb. at New York	Value.	Calendar Year.	Pounds of Nickel in Matte Shipped.	Average Price per lb. at New York	Value.
		Cts.	\$			Cts.	\$
1889.....	*830,477	60	498,286	1900.....	7,080,227	47	3,327,707
1890.....	1,435,742	65	933,232	1901.....	9,189,047	50	4,594,523
1891.....	4,035,347	60	2,421,208	1902.....	10,693,410	47	5,025,903
1892.....	2,413,717	58	1,399,956	1903.....	12,505,510	40	5,002,204
1893.....	3,982,982	52	2,071,151	1904.....	10,547,883	40	4,219,153
1894.....	4,907,430	38½	1,870,958	1905.....	18,876,315	40	7,550,526
1895.....	3,888,525	35	1,360,984	1906.....	21,490,955	42	8,948,834
1896.....	3,397,113	35	1,188,990	1907.....	21,189,793	45	9,535,407
1897.....	3,997,647	35	1,399,176	1908.....	19,143,111	43	8,231,538
1898.....	5,517,690	33	1,820,838	1909.....	26,282,991	36	9,461,877
1899.....	5,744,000	36	2,067,840				

\*Calculated from shipments made by rail.

The companies engaged in mining and smelting nickel ores are:—

The Canadian Copper Company (The International Nickel Company) of Copper Cliff, Ont., and New York.

The Mond Nickel Company, 'Victoria Mines, Ont., and London, England.'

Reference has already been made to the occurrence of nickel as one of the minor constituents of the silver ores of the Cobalt district. The quantity of nickel contained in the ores shipped from this district has been estimated by the Ontario Bureau of Mines as follows:—

Year.	Ore shipped.	Nickel content.
	Tons.	Tons.
1904.....	158	14
1905.....	2,144	75
1906.....	5,335	160
1907.....	14,788	370
1908.....	25,624	612
1909.....	30,677	766

A large portion of these ores, particularly the high grade, is now being reduced at Copper Cliff, Thorold, and Deloro. At each of these plants silver bullion and white arsenic are being recovered. The residues or speiss resulting from these operations and carrying values in silver, cobalt, and nickel are either exported or reserved for future treatment. Cobalt oxide and nickel oxide have both been produced in small quantities at Thorold and preparations have been made for their recovery at Deloro. The residues above mentioned, produced in 1908, were reported as 1,326 tons containing 363,140 pounds of nickel; and in 1909, 2,660 tons containing 758,966 pounds of nickel.

Statistics of the exports of nickel as compiled from the Customs Department's reports are shown in Table 2, and the imports in Table 3.

NICKEL.—TABLE 2.

## Exports of Nickel contained in Ore, Matte, or other Product.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Lbs.	Value.
	\$		\$			\$
1890. ....	89,568	1897. ....	723,130	1903. ....	12,699,227	1,116,099
1891. ....	667,280	1898. ....	1,019,363	1904. ....	11,233,869	1,091,349
1892. ....	293,149	1899. ....	939,915	1905. ....	17,318,059	1,569,693
1893. ....	629,692	1900. ....	1,031,030	1906. ....	20,653,845	2,042,965
1894. ....	559,356	1901. ....	751,080	1907. ....	19,376,335	2,280,374
1895. ....	521,783	1902. ....	1,007,211	1908. ....	19,419,893	1,866,624
1896. ....	658,213			1909. ....	25,616,398	2,676,483

NICKEL.—TABLE 3.

## Imports of Nickel and Nickel Anodes.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1890. ....	3,154	1897. ....	4,737	1903. ....	26,177
1891. ....	3,889	1898. ....	5,882	1904. ....	14,682
1892. ....	3,208	1899. ....	9,449	1905. ....	19,076
1893. ....	2,905	1900. ....	6,988	1906. ....	15,976
1894. ....	3,528	1901. ....	12,029	1907. ....	19,511
1895. ....	4,267	1902. ....	15,448	1908. ....	36,870
1896. ....	4,787			1909. ....	46,581

The only other important producer of nickel ore outside of Canada is the French colony of New Caledonia. The exports of nickel ore from this source since 1898 have been as follows in metric tons:—

Exports of Nickel Ore from New Caledonia.<sup>1</sup>

Year.	Metric Tons.	Year.	Metric Tons.	Year.	Metric Tons
1898. ....	53,200	1902. ....	129,653	1906. ....	118,890
1899. ....	103,908	1903. ....	77,360	1907. ....	120,106
1900. ....	100,319	1904. ....	98,655	1908. ....	108,000
1901. ....	133,814	1905. ....	125,289		

<sup>1</sup> Statistique de l'Industrie Minérale en France et en Algérie, Paris.

The nickel ore of New Caledonia carries about 6½ per cent of nickel. The actual output in 1909 is reported as not less than 120,000 tons,<sup>1</sup> while stocks on hand on December 31, 1909, are reported by the same authority as not less than 122,000 tons.

(<sup>1</sup>) Report of British Acting Consul at Noumea, New Caledonia, as quoted in Engineering and Mining Journal.

Practically all of the above ore is smelted in France, Germany, and England.

The production of raw nickel at smelting works (partly estimated) is given by the 'Metallgesellschaft' as follows, in metric tons:—

### Production of Raw Nickel at Smelting Works, in Metric Tons.

Producing Country.	1902	1903	1904	1905	1906	1907	1908	1909
United States of North America, and Canada	4,700	5,100	6,000	4,500	6,500	6,500	6,000	9,000
England.....	1,300	1,700	2,200	3,100	3,200	3,200	2,800	2,800
Germany (1).....	1,600	1,600	2,000	2,700	2,800	2,600	2,600	3,100
France.....	1,100	1,500	1,800	2,200	1,800	1,800	1,400	1,200
Total production (2).....	8,700	9,900	12,000	12,500	14,300	14,100	12,800	16,100

(1) The figures of production stated for Germany only cover the output in the Kingdom of Prussia; nickel is also produced in the Kingdom of Saxony, but no data are obtainable of this production, which is, however, not important.

(2) The entire production of nickel, apart from quite insignificant quantities obtained in Germany, Norway, and the United States of America, comes from New Caledonian and Canadian ores.

Statistics of the average yearly prices of nickel in Europe are also given by the same authority as follows:—

### Yearly average prices of Nickel in Europe in Cents per Pound, and Marks per Kilogram.

Year.	Prices in Marks per Kilo.	Cents per Lb.	Year.	Marks per Kilo.	Cents per Lb.
1889.....	4.50	48.6	1900.....	3.00	32.4
1890.....	4.50	48.6	1901.....	2.90-3.20	31.3-34.6
1891.....	4.50	48.6	1902.....	2.90-3.50	31.3-37.8
1892.....	4.50	48.6	1903.....	3.00-3.75	32.4-40.5
1893.....	3.80	41.0	1904.....	3.00-3.75	32.4-40.5
1894.....	3.60	38.9	1905.....	3.00-3.75	32.4-40.5
1895.....	2.60	28.1	1906.....	3.00-4.00	32.4-43.2
1896.....	2.50	27.0	1907.....	3.20-3.75	34.6-40.5
1897.....	2.50	27.0	1908.....	3.00-3.50	32.4-37.8
1898.....	2.50	27.0	1909.....	3.00-3.50	32.4-37.8
1899.....	2.50	27.0			

Mark=23.8 cents.      Kilogram=2.20462 lbs.



## SILVER.

Owing to the rapid development of the Cobalt silver camp in Ontario during the past four years, the production of silver in Canada has, in point of value, taken second place in the list of our mineral productions, being exceeded only by coal.

The total production of silver in 1909, including that produced as bullion and the metal estimated as recovered from ores sent to smelters or otherwise treated, was reported as 27,529,473 fine ounces, which, compared with a production of 22,106,233 ounces in 1908, shows an increase of 5,423,240 ounces or 24.5 per cent. The average value per ounce of fine silver in 1909, according to New York quotations, was 51.503 cents per ounce; as compared with an average value of 52.864 cents in 1908, a decrease of about 2.6 per cent. The total value of the silver production in 1909 was \$14,178,504, an increase of \$2,492,265 or 21 per cent over the value, \$11,686,239, in 1908.

A comparison of the production of 1908 and 1907 shows an increase in 1908 of 9,326,434 ounces or 73 per cent in quantity, and \$3,337,580 or 40 per cent in value, the average price in 1908 having decreased about 24 per cent from 1907.

Statistics of the annual production of silver since 1887 are shown in Table 1.

SILVER.—TABLE 1.  
Annual Production, 1887-1909.

Year.	Ozs.	Value.	Average price per oz.	Year.	Ozs.	Value.	Average price per oz.
		\$	Cts.			\$	Cts.
1887.....	355,083	347,271	98 00	1899.....	3,411,644	2,032,658	59 58
1888.....	437,232	410,998	94 00	1900.....	4,463,225	2,740,362	61 33
1889.....	383,318	358,785	93 60	1901.....	5,539,192	3,265,354	58 95
1890.....	400,687	419,118	104 60	1902.....	4,291,317	2,238,351	52 16
1891.....	414,523	409,549	98 00	1903.....	3,198,581	1,709,642	53 45
1892.....	310,651	272,130	86 00	1904.....	3,577,526	2,047,095	57 22
1893.....		330,128	77 00	1905.....	6,000,023	3,621,133	60 35
1894.....	847,697	534,049	63 00	1906.....	8,473,379	5,659,455	66 79
1895.....	1,578,275	1,030,299	65 28	1907.....	12,779,799	8,348,659	65 33
1896.....	3,205,343	2,149,503	67 06	1908.....	22,106,233	11,686,239	52 86
1897.....	5,558,446	3,323,395	59 79	1909.....	27,529,473	14,178,504	51 50
1898.....	4,452,333	2,593,929	58 26				

From 1887 to 1893, the production ranged in value between \$300,000 and \$400,000, and was derived chiefly from the Provinces of Ontario and Quebec. The next three years saw a rapid increase in the production, due to the development of the silver-lead ore deposits in British Columbia, and in 1896 a production of over \$2,000,000 is recorded. From that year until 1905 the production

varied from \$2,000,000 to \$3,500,000, rising rapidly during the next four years to \$14,178,504 in 1909 as a result of the discovery of the rich ores of the Cobalt district.

Ontario in 1905 produced 40.9 per cent of the total output. In 1906 this was increased to 63.7 per cent, and in 1907 to 78.1 per cent. In 1909 the proportion obtained from Ontario was 90.2 per cent and was practically all from the Cobalt district, the contribution of British Columbia being 9.5 per cent.

Statistics of the annual production in each of the Provinces are separately shown in Table 2.

SILVER.—TABLE 2.  
Production by Provinces, 1887-1909.

Calendar Year.	ONTARIO.		QUEBEC.		BRITISH COLUMBIA.		YUKON TERRITORY.	
	Ozs.	Value.	Ozs.	Value.	Ozs.	Value.	Ozs.	Value.
		\$		\$		\$		\$
1887.....	190,495	186,304	146,898	143,666	17,690	17,301		
1888.....	208,064	195,580	149,388	140,425	79,780	74,993		
1889.....	181,609	169,986	148,517	139,012	53,192	49,787		
1890.....	158,715	166,016	171,545	179,436	70,427	73,666		
1891.....	225,633	222,926	185,584	183,357	3,306	3,266		
1892.....	41,581	36,425	191,910	168,113	77,160	67,592		
1893.....		8,689		126,439		195,000		
1894.....			101,318	63,830	746,379	470,219		
1895.....			81,753	53,369	1,496,522	976,930		
1896.....			70,000	46,942	3,135,343	2,102,561		
1897.....	5,000	2,990	80,475	48,116	5,472,971	3,272,289		
1898.....	85,000	49,521	74,932	43,655	4,292,401	2,500,753		
1899.....	202,000	120,352	40,231	23,970	2,939,413	1,751,302	230,000	137,034
1900.....	161,650	99,140	58,400	35,817	3,958,175	2,427,548	290,000	177,857
1901.....	151,400	89,250	41,459	24,440	5,151,333	3,036,711	195,000	114,953
1902.....	145,000	75,632	42,500	22,168	3,917,917	2,043,586	185,900	96,965
1903.....	17,777	9,502	28,600	15,287	2,996,204	1,601,471	156,000	83,382
1904.....	206,875	118,376	15,000	8,533	3,222,481	1,843,935	133,170	76,201
1905.....	2,451,356	1,479,442	19,620	11,841	3,439,417	2,075,757	89,630	54,093
1906.....	5,401,766	3,607,894	17,686	11,813	2,990,262	1,997,226	63,665	42,522
1907.....	9,982,363	6,521,178	16,000	10,452	2,745,448	1,793,519	35,988	23,510
1908.....	19,398,545	10,254,847	13,299	7,030	2,631,389	1,391,058	63,000	33,304
1909.....	24,822,099	12,784,126	13,233	6,815	2,649,141	1,364,387	45,000	23,176

The average price of fine silver in New York during 1909 varied between a maximum of 52.9 cents per ounce in May and a minimum of 50.1 cents per ounce in March, the average being 51.503 cents per ounce.

In London, the average price of silver in 1909 was 23.726 pence per standard ounce of a fineness of 0.925. For the year 1908 the average price per fine ounce in New York was 52.864 cents, the highest being 56 cents in February and the lowest 48.7 cents in December of that year.

The average monthly prices of silver in New York from 1904 to 1909 and in London during 1909, are shown in tabulated form below:—

### Average Monthly Prices of Silver.

Months.	NEW YORK.—CENTS PER FINE OUNCE.					LONDON.— PENCE PER STANDARD OUNCE (a)
	1905.	1906.	1907.	1908.	1909.	1909.
January.....	60·690	65·288	68·673	55·678	51·750	23·834
February.....	61·023	66·108	68·835	56·000	51·472	23·706
March.....	58·046	64·597	67·519	55·365	50·468	23·227
April.....	56·600	64·765	65·462	54·505	51·428	23·708
May.....	57·832	66·976	65·981	52·795	52·905	24·343
June.....	58·423	65·394	67·090	53·663	52·538	24·166
July.....	58·915	65·105	68·144	53·115	51·043	23·519
August.....	60·259	65·949	68·745	51·683	51·125	23·588
September.....	61·695	67·927	67·792	51·720	51·449	23·743
October.....	62·034	69·523	62·435	51·431	50·923	23·502
November.....	63·849	70·813	58·677	49·647	50·703	23·351
December.....	64·850	69·050	54·565	48·769	52·226	24·030
Average for the year.....	60·352	66·791	65·327	52·864	51·503	23·726

(a) 925 parts fine.

Important quantities of silver are now being produced in Canada, both as fine metal and as silver bullion ranging in fineness from 850 to 998·2.

Fine silver is produced at Trail, B.C., by the Consolidated Mining and Smelting Company of Canada, chiefly from the silver-lead ores of that Province, and is shipped to China, the United States, and to the Ottawa mint.

The annual production of fine silver at Trail since 1904 has been as follows:—

Year.	Fine Ozs.	Year.	Fine Ozs.
1904.....	551,450	1908.....	1,956,039
1905.....	1,088,328	1909.....	2,003,003
1906.....	1,263,809		
1907.....	1,631,422	Total.....	8,494,351

In Ontario ores from the Cobalt district are now being treated at three metallurgical works operated by the following companies:—

The Canadian Copper Company, at Copper Cliff, Ont.

The Deloro Mining and Reduction Company, at Deloro, Ont.

The Coniagas Reduction Company, at Thorold, Ont.

Silver bullion of fineness varying from 850 to 998·2 is produced at the works, other products being white arsenic, and, in the case of the Coniagas plant, nickel oxide and cobalt oxide. In each case residues carrying silver, arsenic, cobalt, and nickel, are either shipped to the United States or held in re-

serve for further refining. The silver bullion is in most instances not sufficiently fine to be shipped to the Ottawa mint and finds a market in the United States and in England. The bullion shipped in 1907 contained 4,449,722 fine ounces of silver; in 1908, 11,168,689 fine ounces; and in 1909, 14,385,985 fine ounces. About 52 per cent of the total production of 1909 was, therefore, recovered in Canada as fine metal or as silver bullion.

### Quebec.

The small quantity of silver credited to the Province of Quebec for a number of years represents a small silver content of the pyrite ores mined at Capelton and Eustis in the Eastern Townships.

### Ontario.

From a production valued at only \$118,376 in 1904, the silver output of this Province has grown to a value of over \$12,000,000 in 1909. Not only does it contribute 90 per cent of the total silver production of Canada, but it now forms a very appreciable part (about 10 per cent in 1908) of the total silver output of the world.

According to returns received by this Department, there were shipped during 1909, 27,835 tons of ore and 3,059 tons of concentrates, or a total tonnage of 30,894 tons, having a value of \$13,002,275, besides silver bullion carrying 143,440 fine ounces of silver.

The silver content of ore shipped was estimated as 22,349,717 ounces or an average of 803 ounces per ton, and of the concentrates shipped 3,627,819 ounces or an average of 1,186 ounces per ton; the total silver content of ore, concentrates, and bullion shipped from the mines being 26,120,976 ounces. The mine owners receive payment for only 93 to 98 per cent of the silver content, and in estimating and valuing the production, a deduction of 5 per cent is made from silver contained in ore and concentrates to cover losses in smelting and refining. On this basis the silver recovery is estimated at 24,822,099 ounces and valued at \$12,784,126. Payments for cobalt content were reported as \$94,609.

In 1908, the total shipments, including ore and concentrates, were 25,682 tons containing 19,398,545 ounces of silver, and in 1907, 14,644 tons were reported as shipped containing 9,982,363 ounces of silver.

In the following table a record of the shipments since 1904 is given, the figures for the first three years being those published by the Ontario Bureau of Mines.



## Silver Ore and Bullion Shipments from Cobalt Mines, 1904-1909.

Year.	SHIPMENTS.		SILVER CONTENT.		SILVER IN OUNCES. PER TON.		Silver Bullion Ship- ments. Fine Ounces.	Total value of Silver.
	Ore. Tons.	Con- centrate. Tons.	Ore. Ounces.	Concen- trate. Ounces.	Ore.	Con- centrate.		
								\$
1904....	158	.....	206,875	.....	1,309	.....	.....	118,376
1905....	2,144	.....	2,451,356	.....	1,143	.....	.....	1,473,192
1906....	5,335	.....	5,401,766	.....	1,013	.....	.....	3,607,594
1907....	14,644	.....	9,982,363	.....	682	.....	.....	6,521,178
1908....	25,682	*	19,398,545	*	755	*	.....	10,254,847
1909....	27,835	3,059	22,349,717	3,627,819	803	1,186	143,440	12,784,126

\* Included with ore.

As the camp has developed the average grade of the ore shipped has gradually diminished, although the introduction of concentration plants in 1908, and their increased use in the future will no doubt tend to keep the ore shipped up to a high standard.

With respect to the content of the nickel, cobalt, and arsenic ores, the mining companies are paid for only a small portion of the cobalt content and nothing for the nickel and arsenic; in fact, in certain cases, the latter two are penalized.<sup>1</sup>

The total nickel content of these ores, as estimated by the Ontario Bureau of Mines, is shown in the next table. The figures for ore shipments and silver content while not identical, agree very closely with those given in the previous table.

## Total Production Cobalt Mines, 1904-1909.\*

Year.	Ore and Concentrate shipped.	METALLIC CONTENT.			
		Nickel.	Cobalt.	Arsenic.	Silver.
	Tons.	Tons.	Tons.	Tons.	Ounces.
1904.....	158	14	16	72	206,875
1905.....	2,144	75	118	549	2,451,356
1906.....	5,335	160	321	1,440	5,401,766
1907.....	14,788	370	739	2,958	10,023,311
1908.....	25,624	612	1,224	3,672	19,437,875
1909.....	30,677	766	1,533	4,294	25,897,825
Totals .....	78,726	1,997	3,951	12,895	63,419,008

\* As per Ontario Bureau of Mines.

Nearly 30 per cent of the ore shipped from Cobalt was treated in metallurgical works in Canada and white arsenic is being produced therefrom, of which record will be found under smelter production.

<sup>1</sup> See Schedule of Ore Purchasing Companies.

While the greater number of the operating companies hold unrestricted titles to their properties, several (nine in number) are operating on a royalty basis on mining lands owned and leased by the Timiskaming and Northern Ontario Railway Commission. Mr. Arthur A. Cole, Mining Engineer to the Timiskaming and Northern Ontario Commission, in his annual report, has compiled some very interesting statistics covering the whole district, with respect to ore shipments, concentration, power and labour, prices paid for ore, etc., from which the following tables and extracts have been freely drawn:—

### Ore Shipments from the Cobalt District for the Years 1904 to 1909.

Mine.	1904.	1905.	1906.	1907.	1908.	1909.	Totals.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1 Bailey.....			30·00		88·80	36·85	155·65
2 Beaver.....						51·38	51·38
3 Buffalo.....		200·80	992·80	1,241·54	536·90	648·86	3,620·90
4 Casey-Cobalt..					10·00	8·50	18·50
5 Chambers-Ferland.....					223·89	517·88	741·77
6 City of Cobalt..				50·61	761·04	566·82	1,378·47
7 Cobalt Central..				77·33	187·99	339·01	604·33
8 Cobalt Lake.....					225·97	95·47	321·44
9 Cobalt Townsite				143·22	177·71	27·35	343·28
10 Colonial.....			15·00	40·38			55·38
11 Coniagas.....		30·60	422·02	2,447·37	616·25	806·93	4,317·17
12 Crown Reserve..					657·35	3,167·52	3,824·87
13 Drummond.....	0·50	32·15	274·70	104·13	1,161·38	1,225·47	2,798·33
14 Foster.....		83·85	117·00	312·13	191·20	113·90	818·08
15 Green Meehan..			37·03	93·39			135·42
16 Imperial Cobalt				14·61			14·61
17 Kerr Lake.....		54·95	158·35	319·76	660·24	1,173·42	2,366·72
18 King Edward (Watts).....		19·00		31·12	338·19	146·58	534·89
19 La Rose.....	60·05	607·86	854·61	2,815·45	4,843·17	6,757·21	15,933·35
20 Lawson.....		14·61		61·12			75·73
21 McKinley-Darragh..	20·00	447·09	80·45	742·42	1,808·39	1,056·49	4,154·84
22 Nancy Helen.....				30·10	201·32	116·32	347·74
23 Nipissing.....	57·00	486·02	2,125·08	2,538·26	3,571·96	6,470·52	15,248·84
24 Nova Scotia.....			43·95	272·21	237·95	224·79	778·90
25 North Cobalt..						6·87	6·87
26 O'Brien.....		26·32	114·18	1,491·61	3,459·51	1,419·11	6,510·73
27 Peterson Lake (Leases).....							
(Litt. Nipis'g)					40·67	39·62	80·29
(N. Scotia).....						121·15	121·15
28 Provincial.....					75·84		75·84
29 Princess.....				3·93			3·93
30 Red Rock.....				45·71			45·71
31 Right of Way..			46·25	129·37	750·04	1,608·99	2,534·65
32 Silver Bar.....					0·58		0·58
33 Silver Cliff.....					160·44	149·96	309·50
34 Silver Leaf.....		9·00		46·36	197·03		252·39
35 Silver Queen.....		44·63	130·94	478·57	885·70	316·64	1,856·58
36 Timiskaming.....				204·32	795·20	852·14	1,851·66
37 Timiskaming Cobalt..			20·47	67·98			88·45
38 Timiskaming and Hudson Bay				149·53	1,094·23	743·64	1,987·40
39 Trethewey.....	21·00	218·58	198·48	833·58	1,408·69	1,134·50	3,814·83
40 University.....		16·00	155·28	60·23			231·51
41 Victoria.....					0·47		0·47
42 Violet.....		16·00	20·00				36·00
43 White Silver Mining Co.....		28·45					28·45
Totals.....	158·55	2,336·01	5,836·59	14,851·34	25,362·10	29,942·99	78,487·58

## Shipments from the Cobalt District for the Calendar Year 1909.

Mine.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals.
1 Bailey.....	36 85												36 85
2 Beaver.....													25 73
3 Buffalo.....	29 20	58 39	72 60	43 02	43 90	71 18	46 32	63 45	60 30	55 40	25 65	49 85	51 38
4 Casey-Cobalt.....			8 50								55 25		8 50
5 Chambers-Ferland.....	65 16	26 10	155 05	59 20	29 60	62 30	90 32	30 15					517 88
6 City of Cobalt.....	103 95	93 83	93 81	53 83		57 90	32 00	52 00		28 80	20 45	30 25	366 82
7 Cobalt Central.....		19 81	17 63	37 70	29 87	45 46	39 44	40 20	20 15	45 30		43 45	339 01
8 Cobalt Lake.....							39 68		30 69			25 10	95 47
9 Cobalt Townsite.....												27 35	27 35
10 Coniagas.....	54 15	65 93	91 23	57 66	64 85	61 83	72 26	76 71	86 88	101 08	43 00	31 35	806 93
11 Crown Reserve.....	143 71	362 24	231 46	207 69	279 69	259 97	337 76	230 32	309 80	274 13	167 35	343 40	3,167 52
12 Drummond.....						499 46			171 05		249 47	305 49	1,225 47
13 Foster.....	30 69	73 33	88 72	62 45	162 03	152 15	31 44	91 79	80 26		91 05	158 95	1,173 42
14 Kerr Lake.....	28 45		29 70		21 90		21 28				24 00	21 25	146 58
15 King Edward.....	603 76	487 97	457 08	736 62	585 72	309 20	563 28	420 70	624 81	717 33	629 23	616 51	6,757 21
16 La Rose.....													
17 McKinley-Dar- ragh.....	110 49	45 39	56 48	61 87	80 73	118 45	89 71	111 09	106 48	92 85	119 65	63 30	1,056 49
18 Nancy Helen.....	21 95				21 70			28 97	20 65			23 05	116 32
19 Nipissing.....	461 95	426 88	675 74	392 09	518 48	1,013 72	447 37	578 56	352 62	440 28	482 25	678 98	6,470 52
20 Nova Scotia.....	190 54		34 25										224 79
21 North Cobalt.....													
22 O'Brien.....	30 90	31 45	99 04	127 44	126 59	157 67	127 92	137 70	196 20	158 32	161 43	64 45	6 87
23 Peterson Lake (leases)													1,419 11
(Little Nipissing), (Nova Scotia)	41 05		25 45		32 35		19 62	20 00					39 62
24 Right of Way.....	156 46	152 52	91 71	319 48	165 46	141 65	61 66	102 72	22 30	62 09	100 45	133 95	121 15
25 Silver Cliff.....							30 41		120 84	29 00		27 00	1,008 99
26 Silver Queen.....									30 60				149 06
27 Timiskaming.....	97 72	35 57	56 44	31 45	139 04	63 84		142 56		43 22			316 64
28 Timiskaming and Hudson Bay.....	168 00	32 07	114 17	60 25	92 65	62 45	94 00		29 50	30 00	59 60	30 15	852 14
29 Trethewey.....	34 07	138 02	117 73	123 88	97 22	94 65	64 43				29 85	90 20	743 64
											139 00	76 02	1,134 50
Totals.....	2,409 05	2,137 53	2,516 79	2,499 79	2,491 78	3,287 78	2,325 01	2,241 97	2,385 48	2,356 39	2,404 55	2,886 78	29,942 99

+ Shipped by Argentum Lease. † Now the Hudson Bay Mines.

The ore produced during 1907, 1908, and 1909 was shipped to the following countries for treatment:—

Country.	1907.		1908.		1909.	
	Tons.	Per cent.	Tons.	Per cent.	Tons.	Per cent.
Canada. ....	2,585·05	17·40	7,401·14	29·18	10,230·64	34·47
Great Britain.....	167·34	1·13	222·08	0·88	30·25	0·10
Germany.....			299·46	1·18	106·51	0·35
United States.....	12,098·95	81·47	17,439·42	68·76	19,575·59	65·08
Total.....	14,851·34	100·00	25,362·10	100·00	29,942·99	100·00

Almost all the ore treated in Canada has been high grade, so that while the tonnage in 1909 was about one-third of the total, the value was greater than that of all the ore shipped out of the country.

With respect to concentration, Mr. Cole reports:—

‘Milling and wet concentration have now become a well established feature of the Cobalt camp. There are now nine mills operating in this district with a maximum daily capacity of 850 tons, while four more are under construction which will add another 400 tons when running full. The following is a list of these mills with their respective daily capacities under full load:—

Mill.	Capacity in Tons.
1 Buffalo.....	150
2 Cobalt Central (Standard Cobalt).....	100-110
3 Colonial.....	50
4 Coniagas.....	90
5 King Edward.....	36
6 McKinley-Darragh.....	120-140
7 Nipissing Reduction.....	75
8 Northern Customs.....	140
9 O'Brien.....	90
Under Construction—	
10 Nova Scotia.....	100
11 Silver Cliff.....	125
12 Timiskaming.....	75-80
13 Trethewey.....	100



The following is a statement of the concentration tonnage for the camp during 1909 :—

### Concentration in Cobalt for 1909.

Mill.	Mines.	Ore milled.	Concen- trates.	Concen- tration.
		Tons.	Tons.	Ratio.
Buffalo.....	Buffalo.....	27,875·0	507·00	55-1
	Bailey.....	2,482·0	36·24	68-1
	Cobalt Central.....	21,272·0	362·40	59-1
Cobalt Central.....	Crown Reserve.....	45·0	1·02	44-1
	Foster.....	547·0	10·20	54-1
	Kerr Lake.....	1,093·0	104·79	10-1
Coniagas.....	Coniagas.....	19,671·4	465·70	42-1
Colonial.....	Colonial.....	1,500·0	25·00	60-1
King Edward.....	King Edward.....	4,769·6	105·43	45-1
McKinley-Darragh.....	McKinley-Darragh.....	18,703·0	741·59	25-1
Nipissing Reduction Co.....	Nipissing.....	9,597·0	229·00	49-1
	Cobalt Lake.....	301·9	60·00	5-1
	City of Cobalt.....	2,576·3	57·01	45-1
	La Rose.....	5,988·2	255·62	23-1
	Nancy Helen.....	284·9	5·87	49-1
Northern Customs Concentrator....	Nova Scotia.....	1,173·1	39·71	30-1
	Right of Way.....	1,289·7	28·22	46-1
	Silver Queen.....	2,371·9	132·68	18-1
	Trethewey.....	1,130·8	17·02	66-1
O'Brien.....	O'Brien.....	3,749·5	57·00	†.....
	Totals.....	126,421·3	3,241·50	*39-1

† No comparative ratio can be stated for O'Brien, as all low grade concentrates were cyanided and yielded 12,656 ounces, which were shipped as bullion.

\* The O'Brien is omitted from this ratio.

The mines without mills do a certain amount of concentration by hand picking, etc., and in the case of the Crown Reserve and Hudson Bay mines, coarse jigging is employed.

The Buffalo Mining Company is now operating the cyanide part of the mill, and at the O'Brien mill, cyaniding is one of the principal features. As a result of this, these Companies ship out a certain amount of silver bullion as well as raw concentrates.

A certain amount of ore was treated by wet concentration by the Montreal Reduction and Smelting Company of Canada, at Trout Mills.

The following are the rates offered by the customs mills in the camp, for treating ores.

#### *Northern Customs Concentrator, Limited.*

*Tariff.*—On ore yielding less than 20 ounces silver per ton crushed, retain 10 ounces and return balance to the mining company with 50 per cent of other metals that can be sold.

20 to 35 ounces silver pay.....	50 per cent.
35 " 50 " " .....	55 "
50 " 70 " " " .....	60 "
70 " 90 " " " .....	65 "
90 " 110 " " " .....	70 "
110 " 125 " " " .....	75 "

Ore will also be treated on a tonnage basis of \$4 per ton, ore to be delivered at the mill and concentrates delivered to owners, in their sacks, dried and loaded on cars.

*The Standard Cobalt Mines, Limited—(Cobalt Central).*

Makes the following schedule for milling ore:—

Ore in dumps running 30 ounces or better, 50 per cent of the product from concentration.

Ore	60 ounces and under 80 ounces	55 per cent of product.
"	80 " " 100 " "	63 "
"	100 " " 125 " "	70 "
"	125 " " 150 " "	77 "
"	150 " " 200 " "	82 "
"	200 " " 250 " "	85 "

The above Company pays all charges for hauling and milling of ore, and will deliver at its mill the percentage of product due the mine furnishing the ore.

The *Nipissing Reduction Company* has not at present a fixed tariff for treating ore, but varies the rates to suit conditions and the nature of the ore.

*The Montreal Reduction and Smelting Company of Canada*, at Trout Mills, Ont., treated ores by wet concentration on the following schedule, after the first of June, 1909.

Settlement to be made on the thirtieth day after agreement upon the assays and at the New York quotation price of silver on the day of settlement.

Ores to be delivered f.o.b. at Trout Mills. Charge of treatment \$5 per ton.

Grade.	Percentage of assay paid.
Over 30 ounces	75 per cent.
" 70 "	76 "
" 80 "	78 "
" 90 "	80 "
" 100 "	82 "
" 110 "	83 "
" 120 "	84 "
" 130 "	85 "
" 140 "	86 "
" 150 "	87 "
" 180 to 200	88 "

*Power and Labour.*—The cost of power generation from coal in the camp is necessarily high, even in the most economical plants. In some plants it will run over \$175 per annum, and the average price will likely be over \$150.

With this high cost of power production it was only natural that the great water powers in the vicinity of Cobalt should not be long unharnessed, and now three companies are installing plants and expect to be delivering power in Cobalt early in 1910. These Companies are:—

Cobalt Hydraulic Power Company, Ragged chutes, Montreal river.

Cobalt Power Company, Hound chute, Montreal river.

Mines Power, Limited, Metabetchouan river.

Standard wages in Cobalt camp during 1909 were as follows<sup>1</sup>:—

Surface labourers .....	\$2.25 per day.
Drill runners .....	3.25 "
Drill helpers .....	2.75 "
Mine labourers .....	2.50
Mill men .....	2.25-3.25
Mechanics .....	2.75-3.25
Mechanics helpers .....	2.25-2.75

Day's work consists of 9 hours in mine, 9½ on surface, 12 in mill.

A complete list of the companies recovering and treating ores of the district is also given by Mr. Cole, together with schedules of charges or basis of payment of each.

'The ores produced in the Cobalt district were shipped for treatment during 1909 to the following smelting companies:—

- American Smelting and Refining Company, New York, U.S.A.
- Balbach Smelting and Refining Company, Newark, N.J., U.S.A.
- Beer, Sondheimer and Company, Frankfort-on-Main, Germany.
- Canadian Copper Company, Copper Cliff, Ont., Canada.
- Coniagas Reduction Company of Canada, St. Catharines, Ont., Canada.
- Deloro Mining and Reduction Company, Deloro, Ont., Canada.
- Pennsylvania Smelting Company, Pittsburgh, Pa., U.S.A.
- Quirk, Barton and Company, London, England.
- United States Metals Refining Company, New York, U.S.A.

The Montréal Reduction and Smelting Company of Canada, with works at Trout Mills, Ont., also received some low grade ore from Cobalt, but this was treated by water concentration, as this Company has not yet commenced smelting operations.

*American Smelting and Refining Company, New York, U.S.A.*

This Company received both high and low grade ores from Cobalt, the former being treated at the Company's works at Perth Amboy, N.J., and most of the latter at Denver, Colorado.

The following schedule is offered:—

For ores assaying 1,500 ounces or over per ton.

Silver.—Pay for 94 per cent of the silver content at the New York quotations.

Treatment Charge.—\$8 per ton of 2,000 pounds, dry weight, plus one-half cent on each ounce of silver contained.

Arsenic.—An addition to the working charge will be made at the rate of twenty-five cents per dry ton for each per cent of arsenic in excess of 5 per cent. Sampling free.

Payment.—Thirty days after agreement of assays.

For ores under 1,500 ounces and over 60 ounces per ton.

<sup>1</sup> From the Annual Report of the McKinley-Darragh.

Silver.—Payment for 94 per cent of the silver content at the New York quotations.

Treatment Charge.—\$8 per ton of 2,000 pounds, dry weight.

Arsenic.—An addition to the working charge will be made at the rate of twenty-five cents per dry ton, for each per cent of arsenic in excess of 5 per cent.

Payment.—Forty-five days after date of sampling.

If a mine is willing to contract for a total year's output of 1,000 tons the following schedule is offered:—

For ores under 1,500 ounces and over 60 ounces.

Silver.—Pay for 95 per cent of the silver content at the New York quotations.

Treatment Charge.—\$7 per ton of 2,000 pounds, dry weight.

No payment for cobalt or nickel.

No penalties for insoluble.

Arsenic.—An addition to the working charge will be made at the rate of twenty-five cents per dry ton for each per cent of arsenic in excess of 5 per cent.

Payment.—Payment forty-five days after agreement of assays.

The freight from Cobalt to Perth Amboy is \$9.20 per ton, and from Cobalt to Denver \$12 per ton.

*Balbach Smelting and Refining Company, Newark, N.J., U.S.A.*

This Company is buying high grade silver ore from Cobalt at the following rates. Pay for ores thirty days after agreement of assays and at the silver quotations on date of payment.

*Penalties.*—Forty-five cents for each per cent of arsenic in excess of six per cent, and 6 cents for each per cent of insoluble in excess of iron.

Ores over 1,000 ounces to 1,500 ounces, pay for 93½ per cent of the silver content and a smelting charge of \$4 per ton of ore, with penalties as above.

Ores above 1,500 ounces to 2,000 ounces, pay for 93½ per cent of the silver content and a smelting charge of \$20 per ton of ore, with penalties as above.

Ores over 2,000 ounces silver per ton, pay for 93½ per cent of the silver content and a smelting charge of \$19 per ton of ore, with penalties as above.

*Beer, Sondheimer and Company, Frankfort-on-Main, Germany, and New York.*

High grade silver ore is bought for this Company as follows:—

Pay for 94 to 95 per cent of the silver content.

Smelting charge \$30 per ton.

No refining charge.

Ore to be delivered at New York.

*Canadian Copper Company, Copper Cliff, Ontario.*

All purchases of Cobalt ores are made through the Orford Copper Company, of New York. The purchasing schedule was as follows:—



Purchaser to make payment for:—

75 per cent of silver per ton of ore (2,000 lbs.) when same assays				100 ozs. Ag and over.
84	"	"	"	200
86	"	"	"	300
87	"	"	"	400
89	"	"	"	500
90	"	"	"	600
92	"	"	"	800
93	"	"	"	1,000
93 $\frac{1}{2}$	"	"	"	1,300
93 $\frac{3}{4}$	"	"	"	1,600
94 $\frac{1}{2}$	"	"	"	2,000
94 $\frac{3}{4}$	"	"	"	3,000

Purchaser to make payment of:—

\$10 per ton of ore (2,000 lbs.) when same contains 6 per cent cobalt and over.			
20	"	"	8
30	"	"	12

No payment will be made for cobalt in ores containing less than 6 per cent cobalt, nor in which the nickel content is greater than the cobalt content. Further, purchaser reserves the right to return, at shipper's expense, any such ores (*i.e.* nickel content higher than cobalt content) received at Copper Cliff.

Ore to be delivered by seller to the Canadian Copper Company f.o.b. cars, Copper Cliff, Ont. Ore to be at shipper's risk until sampling is undertaken, as purchaser can assume no responsibility for the ore until same has been taken into its sampler.

Purchaser to sample at its expense, purchaser's and seller's representatives to be present. Assays to be made by Ledoux and Company of New York, at seller's expense, which assays are to govern in settlement.

Payment of 70 per cent of the silver returnable to the seller, as per the above scale, to be made at the New York official price for silver on the first settlement date, which shall be 35 days after the date on which sampling of the ore is completed, and the balance, 30 per cent, on the second settlement date, on the New York official price of silver on that day, which shall be 90 days after sampling of the ore is completed. The purchaser, however, reserves the right to deliver upon either or both of the settlement dates above specified, in lieu of cash, at his option, such silver bullion (commercial bar silver) as is due the seller in settlement upon these dates, such delivery to be made in New York city.

Payment for cobalt will be made as per the above scale when the cobalt content of the ore comes within the specifications mentioned, settlement for same to be made on the first due date for silver, namely, in 35 days after completion of sampling of ore.

Purchaser has named a rate of 75 per cent silver to return to the shipper on ore running from 100 to 200 ounces per ton of 2,000 pounds. This is to be considered as a penalty clause and to apply in such cases where ores under 200 ounces have been shipped by mistake. Purchaser does not agree to accept regular shipments of ore which run less than 200 ounces of silver per ton of 2,000 pounds.

No payment will be made for cobalt in ores containing less than 6 per cent cobalt, nor in which the nickel content is higher than the cobalt content.

Further, purchaser reserves the right to return at shipper's expense, any such ores (*i.e.* nickel content higher than cobalt content) received at Copper Cliff.

Ore to be delivered to seller at Canadian Copper Company, f.o.b. cars, Copper Cliff, Ont. Ore to be at shipper's risk until sampling is undertaken, as purchaser can assume no responsibility for the ore until the same has been taken into its sampler.

Purchaser to sample at its expense, purchaser's and seller's representatives to be present. Assays to be made by Ledoux and Company, New York, at seller's expense, which assays are to govern in settlement. Payment for 70 per cent of the silver returnable to the seller, as per the above scale, to be made at the New York official price of silver on the first settlement date, which shall be 90 days after sampling of ore is completed. The purchaser, however, reserves the right to deliver upon either or both of the settlement dates above specified, in lieu of cash, at its option, such silver bullion (commercial bar silver) as is due the seller in settlement upon these dates, such delivery to be made in New York city.

Payment for cobalt will be made as per the above scale, when cobalt content of the ore comes within the specifications mentioned, settlement for same to be made on the first due date for silver, namely, in 35 days after completion of sampling of ore.

Purchaser has named a rate of 75 per cent silver returnable to the shipper, on ore running from 100 to 200 ounces per ton of 2,000 pounds. This is to be considered as a penalty clause and to apply only in such cases where ores under 200 ounces have been shipped by mistake. Purchaser does not agree to accept regular shipments of ore which run less than 200 ounces of silver per ton of 2,000 pounds.

All purchasers of these ores are made strictly subject to the following *force majeure* agreement:—

'If by reason of the Acts of God, strikes or other causes beyond the control of either parties hereto, which may legally be called *force majeure*, either of these shall be unable to carry out the conditions of this agreement as to shipment, receipt or treatment of consignments, this agreement shall be suspended as long as this condition shall continue, and the term of this agreement shall then be extended for such a period as shall be equivalent to the time of delay or interruption.'

Further, this clause shall also cover unavoidable and extraordinary delays should they occur when the speiss or silver bullion resultant from the smelting and treatment of these ores is in transit between the Copper Cliff and Camden plants of the purchaser and between either of the above plants and the silver refinery of the Balbach Smelting Company, Newark, N.J., U.S.A.

*The Coniagas Reduction Company, Limited, St. Catharines, Ont.*

The above Company will purchase cobalt and silver ores on the following schedule:—

Will pay for:—

70 per cent of silver content assaying over 20 ozs. and up to 200 ozs. per ton.	
84	200 ozs. per ton.
86	300 "
89	500 "
91	750 "
93	1,000 "
93 $\frac{1}{2}$	1,500 "
94 $\frac{1}{2}$	2,000 "
95	3,000 "

Ores containing less than 100 ounces per ton of ore subject to a treatment charge of \$10 per ton of 2,000 pounds unless the ore contains 12 per cent or over of nickel and cobalt combined.

Terms of Payment for Silver.—Seventy-five per cent of the net proceeds at New York quotations, 30 days after completion of sampling.

Twenty-five per cent of net proceeds at New York quotations, 90 days after completion of sampling.

Cobalt.—

Pay 8 cents per pound of cobalt when ores assay 6 per cent or more.	
" 10	" 8
" 12	" 10

No payment for cobalt when ore assays less than 6 per cent.

Payment for cobalt to be made ninety days after completion of sampling, which will be carried out without unnecessary delay on receipt of the ore. Ore to be delivered f.o.b. Thorold Smelter, via Grand Trunk railway, in carload lots. Ore to be at shipper's risk until sampling is undertaken. Sampling at Coniagas Reduction Company's works at buyer's expense. Sellers to have representatives present during sampling and weighing. Weights to be taken after milling. All purchasers of these ores are made strictly subject to the following *force majeure* agreement:—

'If by reason of the Acts of God, strikes, lockouts, combination by or amongst workmen for their own ends, fire, accidents to or derangement of, the Company's motive power, plant or any part thereof, or any cause or causes beyond its control, delay shall happen in the receipt or treatment of consignments, the terms of payments above specified shall be extended for such period as may be equivalent to the time consumed by such delay or interruption.'

Above terms subject to change without notice.

*Deloro Mining and Reduction Company, Deloro, Ont.*

Tariff on cobalt silver ores and concentrates:—

Silver.—Pay for 98 per cent of silver content.

Treatment Charge.—\$20 per ton of ore and a refining charge of one cent per ounce of silver contained.

Terms of Payment.—Seventy-five per cent of net proceeds at New York quotation 30 days after completion of sampling; 25 per cent of net proceeds at New York quotation 90 days after completion of sampling.

Cobalt.—On ores containing 6 per cent and over, 10 cents per pound for cobalt contained. No payment will be made for cobalt in ores containing more

nickel than cobalt. Payment for cobalt to be made with the second payment for silver. Ledoux and Company's assays accepted with the usual provisions as to umpire assays in case of unusual differences. Above assays to be made at shipper's expense. No charge for sampling. Ore to be delivered in car-load lots f.o.b. Marmora station, C.O.R. This tariff is subject to change without notice.

*Pennsylvania Smelting Company, Pittsburgh, Pa. Works at Carnegie, U.S.A.*

The Pennsylvania Smelting Company buys ores from Cobalt ranging from 50 ounces to 500 ounces per ton on the following schedule:—

Silver.—Pay for 90 per cent, less one cent per ounce.

Treatment Charge.—\$8 per ton. Settling price, average for 20 days following date of arrival. No payment for cobalt or nickel. In some cases arsenic is penalized.

Special contract prices, a little more advantageous to the shipper, are offered for the entire output of the mine, or for a definite tonnage. This Company is also coming into the market for high grade ores.

*Quirk, Barton, and Company, London, England.*

A contract was made for the buying of a limited amount of cobalt ores from one of the mines of Cobalt, but this was of a private nature, hence no general schedule has been issued. At the present time they are not in the market, as the contract they have takes all their capacity.

*United States Metals Refining Company, New York. Works at Chrome, N.J.*

The silver ores from Cobalt that are being purchased by this Company are comparatively low grade, the richest containing 400 ounces silver per ton. No regular schedule is published, but the prices vary with the character of the ore purchased.'

A number of the shipping companies at Cobalt have published, in annual reports, some details of their operations, from which the following extracts have been taken:—

*Coniagas Mines Limited, year ending October 31, 1909.*

'During the past year your mine has been operated day and night except Sunday without interruption, with an average force of 118 men.'

Shipments October 31, 1908, to October 31, 1909:—

Ore, 350 tons containing 807,253 ounces silver.

Concentrates, 426 tons containing 599,975 ounces silver.

Total, 776 tons containing 1,407,228 ounces silver.

'A contract has been entered into with the Cobalt Hydraulic Power Company, Limited, for a supply of compressed air for mining operations at a price that will materially reduce the cost of power. It is expected the power will be available in two or three months.'

The Coniagas Mines Limited owns the issued capital stock of the Coniagas Reduction Company, Limited, except six shares issued to Directors to qualify.



*Buffalo Mines Limited, year ending April 30, 1910.*

*Shipments: Ore.*—During the year 30 cars of ore were shipped, containing 654 tons of concentrates from the mill, and 115½ tons of high grade ore direct from the mine, making a total of 769½ tons of ore and concentrates shipped. The smelter returns from these shipments amounted to 1,386,323 ounces, of which, approximately, 1,026,800 ounces were contained in the concentrates and 359,523 ounces in the ore, or an average of 1,570 ounces per ton in the concentrates and an average of 3,126 ounces per ton in the ore.

*Bullion.*—In addition to this there were shipped 4,286 pounds of silver bullion, the smelter returns from which amounted to 54,479 ounces of fine silver.

There were also on hand on April 30, ready for shipment, 2 tons of high grade ore containing 4,466 ounces, 3½ tons of jig concentrates containing 7,018 ounces, and 10 tons of table concentrates containing 6,038 ounces, also 999 pounds of metallics containing 10,197 ounces, and 1,602 pounds of cyanide precipitates containing 23,229 ounces, or a total of 50,948 ounces on hand, making a total production for the year of 1,491,750 ounces.

*Plant.*—The capacity of the milling plant has been brought up during the year from 90 tons to 130 tons per day, and at present we are making preparations to increase the capacity to 160 tons per day. The cyanide plant has a capacity of from 30 to 40 tons per day.

*Crown Reserve Mining Company, Limited, year ending December 31, 1909.***Shipments.****Total Production.**

Total Shipments 1909.	Weight (Lbs.)	Ozs. Silver.	Gross Value.	Freight and Treatment.	Net Value.
			\$	\$	\$
High grade. ....	1,513,895	3,622,029	1,867,509 22	126,609 83	1,740,899 39
Low grade. ....	4,664,578	346,085	176,820 64	55,190 26	121,630 38
Bullion, ozs. ....	76,152	66,211	35,826 22	2,871 07	32,955 15
Total. ....	3,093 tons	4,034,325	2,080,156 08	184,671 16	1,895,484 92

**Average Value of Ore.**

	Ounces per ton.	Value per ton.
		\$
High grade. ....	4,784.7	2,466 96
Low grade. ....	184.4	75 81
Average. ....	1,304.6	672 66
Bullion. ....	0.869 fine.	

### Cost of Ore, 1909.

Smelter charges and deductions.....	\$184,671 16
Ore handling and marketing.....	39,984 31
Mining and development.....	97,717 74
Power and light.....	29,826 67
Maintenance building, plant, and equipment.....	13,664 10
Mine, general expenses.....	19,389 31
Superintendence and travelling.....	12,332 00
Head office expenses.....	4,225 46
Depreciation at 20 per cent on B. F. and E.....	14,330 15
Total ..	\$416,140 90
New buildings, plant, and equipment.....	\$65,403 26
Total cost of silver per ounce, 10·31 cents.	

### *Kerr Lake Mining Company, year ending August 31, 1910.*

'The production for the year amounted to 3,046,295 ounces. Of this 2,451,384 ounces were produced from the high grade ore (average contents per ton 3,775 ounces) and 594,911 ounces from second grade ore and screenings.

The costs of production per ounce are as follows:—

Mining cost ..	7·54 cents
Shipment and treatment charges.....	2·29 "
Metal deductions ..	2·71 "
Administration and general.....	0·73 "
Total.....	13·27 cents

### *La Rose Consolidated Mines Company, year ending May 31, 1910.*

Class.	Dry Tons.	Net Value per ton.	Gross Ozs. Silver.	Net Value.	Per cent of total Net Value.
		\$		\$	
Silver-cobalt-nickel ore.....	1,876·566	577 19	2,218,070·22	1,083,144 75	75·12
Low grade siliceous ore.....	3,878·235	48 54	519,073·06	188,257 62	13·05
Concentrates.....	599·104	305 08	363,300·65	170,571 72	11·83
Total .....	6,313 905	228 38	3,100,443·93	1,441,974 09	100·00

### Average Assay of Shipments.

	Ozs. Silver per ton.	Per cent Cobalt.	Per cent Nickel.
Silver-cobalt-nickel ore.....	1,181·98	8·71	7·99
Low grade siliceous ore.....	133·84		
Concentrates.....	649·79	7·10	6·36
Average of Total.....	491 05		

## Summary of Shipments for Year ending May 31, 1910.

Dry tons shipped.....	6,313·905
Gross ounces silver contained .....	3,100,443·93
Gross silver value.....	1,620,341·31
Average price received per ounce—cents.....	52·261
Received from sales of cobalt.....	29,698·11
Gross silver value plus cobalt paid for.....	\$1,650,039·42
Smelter deduction, freight, and treatment.....	208,065·33
Net value received from ore sales.....	\$1,441,974·09

## Cost of Producing Silver.

		Per Ton Shipping Ore.	Per Oz. Silver.
Mine operation .. .. .	\$ 448,153 60	\$ 70 76	0·1414
Concentration.....	61,351 54	9 69	0·0193
Depreciation.....	9,414 48	1 49	0·0030
Marketing ore.....	216,936 13	34 25	0·0684
Corporation and travelling expenses.....	2,261 63	0 36	0·0007
	\$ 738,117 38	\$ 116 55	0·2328
Operation University mine.....	9,885 92	1 56	0·0031
	\$ 748,003 30	\$ 118 11	0·2359
Less rents.....	10,160 93	1 61	0·0032
Total cost of production.....	\$ 737,842 37	\$ 116 50	0·2327

*Nipissing Mines Company, year ending December 31, 1909.*

## Shipments in 1909.

	Dry Tons.	Net Value Per Ton.	Gross Ozs. Silver.	Net Value.	Per Cent of Total Value.
High grade ore.....	1,047·6925	\$ 1,518 17	3,241,259·39	\$ 1,590,578 14	73·0
Low grade siliceous ores.....	5,174·196	84 88	1,098,166·93	439,226 56	20·2
Concentrates.....	183·074	400 73	156,606·74	73,364 05	3·4
Nuggets.....	7·6295	9,844 94	150,843·80	75,112 03	3·4
Total.....	6,412·592	\$ 339 68	4,646,876·86	\$ 2,178,280 78	100 00

## Average Assay of Shipments.

	Ozs. Silver Per Ton.	Cobalt Per Cent.	Nickel Per Cent.	Arsenic Per Cent.
High grade ore.....	3,093·71	8·46	6·98	40·93
Low grade siliceous ore.....	212·23	.....	.....	.....
Concentrates.....	855·42	8·32	3·78	.....
Nuggets.....	19,771·12	.....	.....	.....
Average of Total.....	724·64	.....	.....	.....

## Summary of Shipments, 1909.

Dry tons shipped.....	6,412·592
Gross ounces silver contained.....	4,646,876·86
Gross silver value.....	\$ 2,395,430 13
Average price received per ounce—cents.....	51·547
Cobalt paid for—pounds.....	177·706
Received from sales of cobalt.....	\$ 19,832 91
Nickel paid for—pounds.....	117
Received from sales of nickel.....	\$ 14·04
Gross silver value plus cobalt and nickel paid for.....	\$ 2,415,277·08
Smelter deduction, freight, and treatment.....	\$ 236,996·30
Net value received from ore sales.....	\$ 2,178,280·78

## Cost of Producing Silver.

		Per Ton Ore.	Per Oz. Silver.
	\$	\$	\$
Mine operation.....	383,152 11	59 95	0·0811
Concentration.....	35,433 96	5 54	0·0075
Depreciation.....	49,798 84	7 79	0·0105
Marketing ore.....	263,223 83	41 18	0·0557
Corporation, New York Office and travelling expenses.....	12,483 13	1 95	0·0026
	744,091 87	116 41	0·1574
Less miscellaneous income, rent, and interest.....	40,320 16	6 30	0·0085
	703,771 71	110 11	0·1489
Shafts and tunnels account charged to operation.....	71,039 18	11 11	0·0150
Total cost of production.....	774,810 89	121 22	0·1639

*McKinley-Darragh-Savage Mines of Cobalt, Limited, Calendar Year 1909.*

The following table shows the classification of ore shipped and smelter charges:—

	Shipment Tons.	Silver Content Ounces.	Gross Value.	Total Smelter Charges.	Net Return.
			\$		
<i>McKinley-Darragh.</i>					
Nuggets.....	0 673	13,305·60	6,861 26	348 46	6,512 80
No. 1 ore.....	135·172	494,981·59	253,047 90	19,415 89	233,632 01
Jig concentrates.....	178·124	386,149·13	198,561 81	17,193 65	181,368 16
Sand concentrates.....	276·402	264,476·12	135,961 75	14,242 91	121,718 84
Slime.....	235·025	70,212·09	36,170 35	7,057 43	29,112 92
Miscellaneous.....	122·002	36,380·84	18,552 26	3,377 92	15,174 34
Total.....	947·398	1,265,505·37	649,155 33	61,636 26	587,519 07
<i>Savage.</i>					
No. 1 ore.....	23·658	51,890·91	26,822 03	2,288 03	24,534 00
Screenings.....	65·170	7,512·61	3,835 70	1,623 30	2,212 40
Total.....	88·828	59,403·52	30,657 73	3,911 33	26,746 40
Grand Total.....	1,036·226	1,324,908·89	679,813 06	65,547 59	614,265 47



## Average Value of Shipments.

No. 1 ore.....	3,662.44	ozs. per ton.
Jig concentrates.....	2,176.04	" "
Sand ".....	957.85	" "
Slime ".....	294.03	" "

*Timiskaming Mining Company, Limited, year ending January 31, 1910*

## Summary of Ore Shipped.

Grade.	Gross Weight at Mine.	Average Assay ozs. per ton.	Total.	TREATMENT AND FREIGHT.			Net Value Received.
				Recovery Discount.	Treatment	Freight.	
	Tons.		Ounces.	\$	\$	\$	\$
First.....	239.47	2,450.0	587,317	14,435 13	11,016 23	3,312 25	276,133 81
Second.....	383.93	198.0	76,042	1,913 66	2,199 13	5,285 14	30,653 22
Low grade....	156.05	48.5	7,571	908 01	1,043 24	531 50	1,471 62
	779.45	861.5	670,930	17,256 80	14,258 60	9,128 89	308,258 65
Cobalt sales.....							1,856 50
Total receipts.....							310,115 15

## Summary of Production Cost.

Ounces produced and shipped.....	670,930
Ounces produced, including milling ore.....	1,171,910

	Total.	Cost per ounce shipped.	Cost per ounce produced.
	\$		
Mining, prospecting, and developing.....	109,639 29	16.4	9.5
Power.....	41,014 63	6.1	3.6
Repairs to machinery and plant.....	4,974 84	0.7	0.4
Stable cost.....	1,590 53	0.2	0.1
Sorting and crushing.....	10,357 72	1.6	0.9
Smelting cost.....	23,387 49	3.5	1.8
General charges.....	40,344 69	6.0	3.4
Total cost of silver produced.....	231,309 19	34.5	19.7

## British Columbia.

The chief sources of the silver production in this Province are the silver-lead ores of the East and West Kootenay, supplemented by the silver contained in the gold-copper-silver ores of Rossland, the Boundary, and the Coast districts. The production in 1909, based on smelter recoveries, was 2,649,141 ounces, valued at \$1,364,387.

As usual the St. Eugene was the premier silver producer, followed among the silver-lead mines by the Whitewater Group, Richmond-Eureka, Van Roi, and Rambler Cariboo in the order named.

The Granby mines at Phoenix would, on account of their large tonnage of copper ores low in silver, come second as silver producers, with the others above mentioned maintaining their relative positions.

About 98 per cent of the total silver was produced from ores in which it was associated with lead, the remainder being obtained from copper-silver ores. The Slocan district, including the Ainsworth, Slocan, Slocan City, and Trout Lake Mining divisions, produced about 50 per cent of the total provincial output in 1909, and the Fort Steele Mining division about 23 per cent, all from argentiferous galena.

The following table is taken from the Annual Report of the Minister of Mines for British Columbia, 1909:—

SILVER.—TABLE 3.

Production in British Columbia by Districts, 1905-1909.<sup>1</sup>

	1905.	1906.	1907.	1908.	1909.
	Ounces.	Ounces.	Ounces.	Ounces.	Ounces.
Cassiar.....	477	26	2,291	14,169	4,593
Kootenay East—					
Fort Steele division.....	1,137,872	1,049,536	821,367	641,855	580,240
Other divisions.....	16,880	22,174	3,955	3,384	825
Kootenay West—					
Ainsworth division.....	99,781	165,915	361,322	314,142	352,555
Nelson ".....	116,729	211,122	236,837	25,067	75,908
Slocan ".....	1,045,948	571,613	590,998	848,595	738,175
Trail Creek ".....	147,753	126,174	126,661	129,558	80,026
Other divisions.....	121,551	79,262	122,232	173,675	169,435
Yale—					
Osoyoos.....	630,407	671,661	469,206	451,323	492,333
Yale.....	3,863	1,034	223	23	.....
Coast and other districts.....	118,156	91,745	70,356	29,598	38,676
Totals.....	3,439,417	2,990,262	2,745,448	2,631,389	2,532,642

\* From the Minister of Mines Reports, British Columbia.

## Yukon.

The figures of silver production in the Yukon given in Table 2 represent the silver alloyed with the placer gold obtained from that district. On an average about one ounce of silver is obtained in each five ounces of crude bullion. In 1908 about 41,000 ounces are credited to the placers and 22,000 ounces to the concentrates shipped from the Windy Arm district. In 1909 the production was 45,000 ounces of silver, valued at \$23,176, all from the placer mines. The mines at Windy Arm were mainly engaged in development work. About 591 tons of ore were shipped during the year from the Venus and Big Thing mines, but no record of silver content was obtained.

## EXPORTS.

The following table shows the statistics of silver contained in ore, matte, or other form exported from Canada since 1886, as compiled from the reports of Trade and Navigation published by the Customs Department.

## SILVER.—TABLE 4.

## Exports of Silver in Ore, Matte, etc.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1886.....	25,957	1894.....	359,731	1902.....	1,820,058
1887.....	206,284	1895.....	994,354	1903.....	1,989,474
1888.....	219,008	1896.....	2,271,959	1904.....	1,904,394
1889.....	212,163	1897.....	3,576,391	1905.....	2,777,218
1890.....	204,142	1898.....	2,902,277	1906.....	5,686,444
1891.....	225,312	1899.....	1,623,905	1907.....	9,941,849
1892.....	56,688	1900.....	2,341,872	1908.....	12,463,482
1893.....	213,695	1901.....	2,026,727	1909.....	15,719,909

## ZINC.

The production of zinc ore in Canada in 1909, as obtained by direct returns from the producers, was 18,371 tons valued at \$242,699, the greater part of which was from British Columbia.

The zinc content of these shipments was returned as 16,468,204 pounds, which, if valued at the average New York prices of spelter during the year at 5.503 cents, would be worth \$906,245.

The Richardson mine in Olden township, Frontenac county, Ontario, produced 895 tons of zinc ore and concentrates.

In the total for the year is included 7,424 tons of zinc ore produced by the Whitewater and Whitewater Deep mines in British Columbia in 1908 and previous years, but not shipped until late in 1908, and for which returns were not received in time for inclusion in that year's report. With this omission, which was noted in the report for that year, the zinc shipments from Canadian mines in 1908 were 452 tons valued at \$3,215, produced by the Richardson mine, Ontario.

The electric zinc smelter at Nelson operated experimentally for a short time, but closed down and nothing further was done throughout the year. At the Blue Bell mine, Kootenay lake, magnetic concentration was experimented with, but no shipments were made.

During the early part of the year, there was much uncertainty regarding the probable outcome of the United States tariff question, but the advance in the price of ore in the United States subsequent to the adoption of the Payne tariff, has made it profitable for the Canadian mines to ship to the United States.

The present schedule of the tariff on zinc ores is as follows:—

On ores containing less than 10 per cent, free of duty.
“ “ 10 per cent or more, and less than 20 per cent, $\frac{1}{4}$ cent per pound.
“ “ 20 per cent or more, and less than 25 per cent, $\frac{1}{2}$ cent per pound.
“ “ 25 per cent or more, 1 cent per pound.

All rates being based on the metallic content of the zinc.

Since the smelters demand over 30 per cent zinc, only the maximum rate affects Canadian ores. The zinc ore from Ontario is shipped to Europe for treatment, but the greater part of the British Columbia production goes to the United States zinc smelters, which usually pay on a basis of 45 per cent zinc content. The base price varies with the price of spelter at St. Louis, and a stated amount is added or deducted for every unit of zinc in excess of or less than the base. The silver is settled for at the New York price after making deductions for losses in treatment. Limits are frequently set which lead or lime contents may not exceed.



A typical example may be given. A certain mine is paid \$20.50 per short ton for zinc concentrates carrying 45 per cent zinc, when spelter is quoted at 5 cents per pound at St. Louis. For every unit above or below 45 per cent zinc, 85 cents is added or deducted. For every increase or decrease of one cent per pound in the price of spelter at St. Louis, an increase or decrease is allowed of \$7 per ton of 2,000 pounds, and proportionately for fractions thereof. In the case of the silver content, six ounces per ton are deducted and 75 per cent of the remainder paid for at the New York price. The seller pays freight, customs duty, and collection charges.

During the twenty years previous to 1900, the increase in the consumption of zinc in Canada as shown by the imports was considerable, though fluctuating, but since 1900 it has increased very steadily and rapidly. In 1880 the consumption recorded was some 744 tons, in 1889 it had risen to 1,426 tons, and remained near that point until about 1899, when the imports were 1,212 tons. Since that date, however, there has been a rapid and steady increase, the imports having risen to 4,610 tons during the fiscal year ending March 1909 and to 7,795 tons during the year ending December, 1909. It will be observed that the production in 1908 and 1909 was practically equivalent to the rate of consumption.

Statistics of the production and imports of zinc, and the average monthly prices of spelter on the New York and London markets for ten years, are given in the accompanying tables.

The imports of zinc, in blocks and sheets, and of spelter, totalled during the calendar year 1909 about 7,795 tons, valued at \$791,164, in addition to about \$16,073 worth of manufactures of zinc.

The following is a list of zinc producers in 1908 and 1909:—

Mine.	Locality.	Company Operating.
Whitewater.....	Whitewater, B. C.....	S.S. Fowler and associates.
Whitewater Deep.....	" ".....	" ".....
Lucky Jim.....	Kaslo, B. C.....	Lucky Jim Zinc Mines Ltd.
Van Roi.....	Silverton, B.C.....	Van Roi Mining Co. Ltd.
Reco.....	Sandon ".....	Reco Mining & Milling Co.
Ruth.....	" ".....	The Ruth Mines Ltd.
Long Lake.....	Olden Tp., Frontenac Co., Ont..	Jas. Richardson & Sons.

ZINC.—TABLE 1.  
Annual Production of Zinc.

Calendar Year.	Zinc Ore Shipped.		Metallic Zinc in Ore Shipped.	
	Tons.	Spot Value.	Pounds.	Final Value.
		\$		\$
1898.....	1,162	11,000	788,000	36,011
1899.....	865	18,165	814,000	46,805
1900.....	261	4,810	212,000	9,342
1901.....				
1902.....	158	1,659	142,200	6,882
1903.....	1,000	10,500	900,000	48,660
1904.....	597	3,700	477,568	24,356
1905.....	9,413	139,200	*	*
1906.....	1,154	23,800	*	*
1907.....	1,573	49,100	*	*
1908.....	452	3,215	*	*
1909.....	†18,371	242,699	16,468,204	.....

\* Figures not available.

†Includes 7,424 tons shipped late in 1906.

ZINC.—TABLE 2.  
Imports of Zinc in Blocks, Pigs, and Sheets.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$			\$
1880.....	13,805	67,881	1890.....	18,236	92,530	1900.....	28,748	156,167
1881.....	20,920	94,015	1891.....	17,984	105,023	1901.....	20,527	103,457
1882.....	15,021	76,631	1892.....	21,881	127,302	1902.....	34,871	141,560
1883.....	22,765	94,799	1893.....	26,446	124,360	1903.....	26,646	142,827
1884.....	18,945	77,373	1894.....	20,774	90,680	1904.....	25,553	138,057
1885.....	20,954	70,598	1895.....	15,061	63,373	1905.....	25,141	141,514
1886.....	23,146	85,599	1896.....	20,223	80,784	1906.....	24,462	158,438
1887.....	26,142	98,557	1897.....	11,946	57,754	1907 (9 mos.)	18,427	126,221
1888.....	16,407	65,827	1898.....	35,148	112,785	1908.....	30,362	191,081
1889.....	19,782	83,935	1899.....	18,785	107,477	1909 duty free	26,222	141,066

ZINC.—TABLE 3.  
Imports of Spelter.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$			\$
1880.....	1,073	5,301	1890.....	14,570	71,122	1900.....	5,836	29,416
1881.....	2,904	12,276	1891.....	6,249	31,459	1901.....	14,621	58,283
1882.....	1,654	7,779	1892.....	13,909	62,550	1902.....	18,356	80,757
1883.....	1,274	5,196	1893.....	10,721	49,822	1903.....	23,159	110,817
1884.....	2,239	10,417	1894.....	8,423	35,615	1904.....	33,952	164,751
1885.....	3,325	10,875	1895.....	9,249	30,245	1905.....	37,941	206,244
1886.....	5,432	18,238	1896.....	10,897	40,548	1906.....	50,137	290,686
1887.....	6,908	25,007	1897.....	8,342	32,826	1907 (9 mos.)	42,465	269,044
1888.....	7,772	29,762	1898.....	2,794	13,561	1908 Duty free	55,593	314,369
1889.....	8,750	37,403	1899.....	5,450	29,687	1909.....	65,981	310,688

\*Spelter in blocks and pigs.

ZINC.—TABLE 4.

## Imports of Zinc, Manufactures of.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	8,327	1890.....	6,472	1900.....	11,475
1881.....	20,178	1891.....	7,178	1901.....	6,882
1882.....	15,526	1892.....	7,563	1902.....	6,683
1883.....	22,599	1893.....	7,464	1903.....	9,754
1884.....	11,952	1894.....	6,193	1904.....	12,682
1885.....	9,459	1895.....	5,581	1905.....	11,912
1886.....	7,345	1896.....	6,290	1906.....	12,917
1887.....	6,561	1897.....	5,145	1907 (9 months)...	12,556
1888.....	7,402	1898.....	10,503	1908.....	19,240
1889.....	7,233	1899.....	14,661	1909.....	15,621

1909 { Zinc seamless drawn tubing.....	Duty Free.	0
" , manufactures of, N.O.P.....	25 %	\$ 15,621
Total . . . . .		\$ 15,621

World's Consumption of Spelter by Countries, in 1907 and 1908, in Short Tons.<sup>1</sup>

Country.	1907.	1908.	Country.	1907.	1908.
Austria-Hungary ..	34,171	35,925	Russia.....	19,290	19,946
Belgium.....	60,627	74,936	Spain.....	5,180	5,290
France.....	76,720	85,956	United States.....	228,524	215,401
Germany.....	192,792	198,580	Other countries.....	13,228	11,020
Great Britain.....	154,653	152,627			
Holland.....	4,189	4,188	Totals.....	796,870	813,126
Italy.....	7,496	9,257			

<sup>1</sup> Mineral Resources of the United States, 1908.

## World's Production of Spelter, in Short Tons.\*

Country.	1904	1905	1906	1907	1908
Australia .....			1,131	1,098	1,198
Austria and Italy .....	10,192	10,315	11,883	12,522	14,063
Belgium.....	154,314	160,496	168,067	176,307	181,851
France and Spain.....	54,107	55,524	59,293	61,438	61,512
Germany—					
Rhine district .....	72,083	74,127	75,729	77,459	80,670
Silesia.....	138,538	143,243	150,282	152,611	158,328
Great Britain .....	50,949	56,140	57,971	61,286	60,029
Holland.....	14,442	15,176	16,150	16,526	19,017
Poland.....	11,693	8,422	10,595	10,735	9,740
United States .....	186,704	203,849	224,770	249,860	210,424
Total .....	693,022	727,292	775,871	813,842	796,832

\* Mineral Resources of the United States, 1908.

11797—9½

Average Monthly and Yearly Prices of Spelter (ordinary brands) in London.<sup>1</sup>

Month.	1900			1901			1902			1903			1904		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January.....	21	3	6	18	13	3	16	13	—	20	—	8	21	11	2
February.....	22	3	8	17	13	7	17	14	2	20	15	4	21	16	5
March.....	21	11	11	16	11	4	17	13	4	22	18	2	21	19	6
April.....	22	2	10	16	11	4	17	17	—	22	8	7	22	5	1
May.....	21	12	3	17	6	3	18	9	—	21	2	4	22	2	10
June.....	19	19	7	17	5	9	18	11	8	20	8	2	21	14	6
July.....	19	19	6	16	11	4	18	19	11	20	8	5	22	2	9
August.....	19	8	1	16	15	7	18	16	8	20	9	5	22	7	6
September.....	18	19	5	16	16	8	19	4	7	20	17	7	22	11	5
October.....	19	—	10	16	18	1	19	5	4	20	9	4	23	1	7
November.....	19	—	5	16	17	5	19	11	8	20	14	7	24	12	9
December.....	18	13	8	16	11	8	19	15	6	20	19	10	24	17	1
Year.. . . . .	20	5	6	17	0	7	18	0	11	20	19	5	22	11	10

Month.	1905			1906			1907			1908			1909		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January.....	24	19	9	28	8	2	27	7	1	20	6	3	21	6	3
February.....	24	10	6	26	2	4	26	1	5	21	—	7	21	8	9
March.....	23	13	6	24	15	3	26	4	8	21	1	5	21	8	8
April.....	23	14	3	25	19	3	25	17	5	21	6	1	21	10	1
May.....	23	11	8	27	—	2	25	14	2	20	2	10	21	19	—
June.....	23	16	8	27	9	9	24	10	2	19	2	2	21	19	11
July.....	23	19	6	26	15	11	23	18	11	18	14	1	21	18	9
August.....	24	14	6	27	—	5	22	1	7	19	6	9	22	—	3
September.....	26	8	3	27	12	5	21	—	11	19	10	2	22	17	1
October.....	28	1	7	27	18	10	21	12	11	19	15	1	22	3	4
November.....	28	5	11	27	15	1	21	8	4	20	17	1	23	2	1
December.....	28	14	11	27	19	3	20	3	3	20	19	2	23	1	3
Year. . . . .	25	7	7	27	1	5	23	16	9	20	3	5	22	3	—

<sup>1</sup> From the annual statistical publication for 1910 of the Metallgesellschaft etc. of Frankfurt-on-Main, Germany.

Monthly and Yearly Average Prices of Spelter in New York, in Cents per Pound.<sup>1</sup>

Month.	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
January.....	4·65	4·13	4·27	4·865	4·863	6·190	6·487	6·732	4·513	5·141
February.....	4·64	4·01	4·15	5·043	4·916	6·139	6·075	6·814	4·785	4·889
March.....	4·60	3·91	4·28	5·349	5·057	6·067	6·209	6·837	4·665	4·757
April.....	4·71	3·98	4·37	5·550	5·219	5·817	6·087	6·687	4·645	4·965
May.....	4·53	4·04	4·47	5·639	5·031	5·434	5·997	6·441	4·608	5·124
June.....	4·29	3·99	4·96	5·697	4·760	5·190	6·096	6·419	4·543	5·402
July.....	4·28	3·95	5·27	5·662	4·873	5·396	6·006	6·072	4·485	5·402
August.....	4·17	3·99	5·44	5·725	4·866	5·706	6·027	5·701	4·702	5·729
September.....	4·11	4·08	5·49	5·686	5·046	5·887	6·216	5·236	4·769	5·796
October.....	4·15	4·23	5·38	5·510	5·181	6·087	6·222	5·430	4·801	6·199
November.....	4·29	4·29	5·18	5·038	5·513	6·145	6·375	4·925	5·059	6·381
December.....	4·25	4·31	4·78	4·731	5·872	6·522	6·593	4·254	5·137	6·249
Year. . . . .	4·39	4·07	4·84	5·40	5·100	5·822	6·198	5·964	4·726	5·503

<sup>1</sup> As published in the "Engineering and Mining Journal" of New York.



## MISCELLANEOUS METALLIC MINERALS.

### ALUMINIUM.

The Northern Aluminium Company have extensive works at Shawenegan Falls, Que., where they manufacture aluminium from imported ores. They have also a well equipped wire mill where the metal is made into aluminium wire and cables, which are now used extensively in transmission of electricity. No Canadian raw material is used, but it is interesting to mention the industry as it may stimulate search and prospecting for ores of aluminium. The Northern Aluminium Company use bauxite imported from France, Germany, and the United States.

There being but one firm engaged in production, we are precluded from publishing statistics of production.

The exports of aluminium during the past five years have been as follows:—

#### Exports of Aluminium.

Calendar Year.	INGOTS, BARS, ETC.		MANUFACTURES.
	Lbs.	Value.	Value.
1904.....	1,288,314	\$ 278,270	\$ 118
1905.....	2,535,386	508,219	1,588
1906.....	4,521,486	899,113	2,244
1907.....	5,478,203	1,109,353	1,499
1908.....	1,713,800	399,785	1,727
1909.....	6,134,500	918,195	3,453

*Prices.*—The price of aluminium in New York during the first half of January, 1908, was about 38 cents per pound. About the middle of the month the quotation was reduced to 33 cents and remained constant until the middle of October, when a further reduction took place, the prices quoted until the end of the year ranging from 22 to 24 cents. During the last months of the year, the prices quoted in Europe were from 13 to 14 cents per pound.

In 1909, during the first six months of the year, the price of ingots in New York varied from 22 to 24 cents per pound, while during the last six months, quotations were from 20 to 23 cents. The price of aluminium in London, England, in December, 1909, was about 15 cents per pound.

## ANTIMONY.

The total value of the production of antimony in Canada in 1909 was approximately \$5,860. Some 35 tons of concentrates were produced at West Gore, Nova Scotia, and shipped to England for refining, while about 61,200 pounds of antimony metal were produced, chiefly at the new works of the Canadian Antimony Company, Limited, at Lake George, New Brunswick, and partly at the Consolidated Mining and Smelting Company's refinery at Trail, B.C. The refined metal was valued at about 7 cents a pound.

Direct returns were not received from producers of antimony ore for 1908, but the Customs returns show an export of 148 tons valued at \$5,443.

In 1907, the production was 2,016 tons of antimony ore shipped, valued at \$65,000; and 63,850 pounds of refined antimony, valued at \$5,108.

In British Columbia some of the lead ores contain a small percentage of antimony, about one-third of one per cent, and some refined antimony was recovered at Trail in 1907 and 1909, the recovery being somewhat irregular.

The auriferous antimony property at West Gore, Hants county, Nova Scotia, formerly operated by the Dominion Antimony Company, Limited, was in a receiver's hands during the early part of the year, but was taken over in July by the West Gore Antimony Company.

No mining was done during the year, but the 100 ton concentrating mill erected by the former owners was put in shape for operation, and a small quantity of concentrate made and shipped.

At St. George, New Brunswick, the Canadian Antimony Company, Limited, has put into operation smelting and reduction works for the treatment of the antimony ores from the Lake George mine.

The ore is treated in stack furnaces of special design, with the addition of coke for fuel. The percentage of coke used varies from 5 per cent to 10 per cent, according to the nature of the ore. The oxide is condensed in chambers and assays from 73 per cent to 80 per cent metallic antimony. The two furnaces in the sublimation plant will treat from nine to ten tons each per day of 24 hours.

The oxide is reduced to metal in a reverberatory furnace with the addition of charcoal and fluxes. This furnace has a capacity of from two to three tons of metal per day of 24 hours.

## Annual Shipments of Antimony Ore.\*

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886 .....	665	31,490	1898 .....	1,344	20,000
1887 .....	584	10,860	1899 to 1904 .....	Nil.	Nil.
1888 .....	345	3,696	1905 (a) .....	527	.....
1889 .....	55	1,100	1906 (a) .....	782	.....
1890 .....	26½	625	1907 * .....	2,016	65,000
1891 .....	10	60	1908 (b) .....	148	5,443
1892 to 1897 .....	Nil.	Nil.	1909* .....	35	1,575

(a) As recorded by the Nova Scotia Department of Mines; no value given.

(b) Exports.

\* In addition to the shipments shown in the table, refined antimony was produced in 1907 to the extent of 63,850 pounds valued at \$5,108, and in 1909, 61,207 pounds valued at \$4,285.

## Exports of Antimony Ores.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1880 .....	40	1,948	1898 .....	1,232	15,295
1881 .....	34	3,308	1899 .....	6¾	190
1882 .....	323	11,673	1900 .....	210	3,441
1883 .....	165	4,200	1901 .....	10	1,643
1884 .....	483	17,875	1902 .....	90	13,658
1885 .....	758	36,250	1903 .....	33	4,332
1886 .....	665	31,490	1904 .....	160	7,237
1887 .....	229	9,720	1905 .....	525	27,118
1888 .....	352½	6,894	1906 .....	420	17,064
1889 .....	30	695	1907 .....	1,327	37,807
1890 .....	38	1,000	1908 .....	148	5,443
1891 .....	3½	60	1909 .....	4	120
1892 to 1897 .....	Nil.	Nil.			

## Imports of Antimony.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880 .....	42,247	5,903	1895 .....	79,707	6,131
1881 .....	.....	7,060	1896 .....	163,209	9,557
1882 .....	183,597	15,044	1897 .....	134,661	8,031
1883 .....	105,346	10,355	1898 .....	156,451	12,350
1884 .....	445,600	15,564	1899 .....	289,066	16,851
1885 .....	82,012	8,182	1900 .....	186,997	20,001
1886 .....	89,787	6,951	1901 .....	350,737	24,714
1887 .....	87,827	7,122	1902 .....	504,822	39,276
1888 .....	120,125	12,242	1903 .....	868,146	65,434
1889 .....	119,034	11,206	1904 .....	418,943	27,112
1890 .....	117,066	17,439	1905 .....	186,454	12,828
1891 .....	114,084	17,483	1906 .....	403,918	56,297
1892 .....	180,308	17,680	1907 (9 mos) .....	321,385	71,493
1893 .....	181,823	14,771	1908 .....	484,899	66,484
1894 .....	139,571	12,249	1909 .....	444,254	32,133

1909	Antimony, or regulus of, not ground, pulverized or otherwise manufactured .....	Duty.	Free.	.....	.....
	Antimony salts .....				
	Total .....				
			405,231	28,482	
			39,023	3,651	
			444,254	32,133	

## COBALT.

Cobalt is an important constituent of the rich silver-cobalt-nickel-arsenides of Coleman and adjacent townships, more familiarly known as the 'Cobalt' district, Province of Ontario. The metal is also found as a constituent of the nickel-copper ores of the Sudbury district in the same Province.

With the exception of a small amount of cobalt oxide recovered during 1908, at the metallurgical works of the Coniagas Reduction Company, at Thorold, Ont., from the ore of the Coniagas mine at Cobalt, there has been no production of this metal in Canada.

Small quantities of ores have been shipped from the Cobalt district primarily as cobalt ores. With respect to the greater part of the ore shipped, in which silver was the chief constituent of value, most of the purchasing smelters made no allowance whatever for cobalt. The Canadian Copper Company and the Deloro Mining and Reduction Company, however, each paid for cobalt in the ore when the cobalt went 6 per cent or over, provided that the nickel content was lower than the cobalt content.

The amount received by the producers of ore for its cobalt content was reported to the Department as \$94,609 in 1909, and \$113,423 in 1908.

No complete statistics are available either as to the total amount of cobalt contained in the ores shipped, as determined by sampling analyses, or as to the amount of cobalt finally recovered by the purchasing companies.

The Ontario Bureau of Mines has estimated the cobalt content of the ore shipped as shown in the following table, in which the values received by the shippers for cobalt are also shown.

Year.	Ores shipped.	Estimated total cobalt content.	Per cent.	Value received by shippers for cobalt.
	Tons.	Tons.	%	\$
1904.....	158	16	10·1	19,960
1905.....	2,144	118	5·5	100,000
1906.....	5,335	321	6·0	80,704
1907.....	14,788	739	5·0	104,426
1908.....	25,624	1,224	4·7	111,118
1909.....	30,677	1,533	5·0	94,965

During 1909, 8,384 tons of these ores were treated in metallurgical works in Canada, and the 2,660 tons of residues or speiss remaining after the recovery of silver and arsenic were reported to contain 1,321,083 pounds of cobalt, or an average of 7·87 per cent of the ore treated.



In 1908 the quantity of ore treated was 7,182 tons, the residue from which, amounting to 1,326 tons, contained 692,170 pounds of cobalt or 4.82 per cent of the ore treated.

The Nipissing Mines Company, as stated in the last Annual Report, shipped during the twelve months ending December 31, 1909, 1,047.69 tons of high grade ore averaging 8.46 per cent cobalt, and 183.07 tons of concentrates averaging 8.32 per cent cobalt. The amount of cobalt paid for was 177,706 pounds, and the value received therefor \$19,832.19.

The La Rose Consolidated Mines Company, during the twelve months ending May 31, 1910, shipped 1,876.56 tons of high grade silver ore, averaging 8.71 per cent cobalt, and 559 tons of concentrates, averaging 7.10 per cent cobalt. The value received for cobalt content was \$29,698.11.

The price of cobalt oxide (78.6 per cent Co) in New York during 1907 remained uniformly at \$2.50 per pound. In 1908 the price fell to \$1.45 in April, and to \$1.40 in November. During the first three months of 1909, from \$1.45 to \$2.60 was quoted, after which the price fell to from \$1.10 to \$1.75, which held until December. In the latter part of December there was a further falling off to 80 or 85 cents per pound.

If 50 per cent of the estimated cobalt content of the ore shipped had been recovered as oxide, it would have had a market value of about \$1,000,000, provided a market could be found for such an output without reducing the price.

## MERCURY.

There has been no production of mercury since 1897. The small production reported in 1895, 1896, and 1897, was derived from the deposits at the western end of Kamloops lake, B.C. These deposits consist of quartz veins containing pockets of cinnabar. These veins are in a zone of decomposed volcanic rock of Tertiary age.

### Production of Mercury.

Calendar Year.	Flasks (76½ lbs.)	Price per flask.	Value.
		\$	\$
1895.....	71	33 00	2,343
1896.....	58	33 44	1,940
1897.....	9	36 00	324

### Imports of Mercury.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
					\$			\$
1882.....	2,443	\$ 965	1892.....	30,936	15,038	1901.....	140,610	94,564
1883.....	7,410	2,991	1893.....	50,711	22,998	1902.....	97,283	56,615
1884.....	5,848	2,441	1894.....	36,914	14,483	1903.....	164,968	91,625
1885.....	14,490	4,781	1895.....	63,732	25,703	1904.....	151,107	80,658
1886.....	13,316	7,142	1896.....	77,869	32,343	1905.....	103,330	48,412
1887.....	18,409	10,618	1897.....	76,058	33,534	1906.....	150,364	69,505
1888.....	27,951	14,943	1898.....	59,759	36,425	1907 (9 mos.)...	98,368	45,662
1889.....	22,931	11,844	1899.....	103,017	51,695	1908.....	178,411	76,549
1890.....	15,912	7,677	1900.....	85,342	51,987	1909 (Duty free)	92,220	46,217
1891.....	29,775	20,223						

## MOLYBDENUM.

Although there are numerous occurrences of molybdenite in Canada of more or less undetermined value, there has been very little production of the mineral.

In 1902, about 6,500 pounds of molybdenum, valued at \$400, were reported as having been taken from a deposit in the township of Laxton, county of Victoria, by John Webber, of Toronto.

In 1903, Mr. A. W. Chisholm, of Kingston, reported the shipment to the United States and elsewhere of 85 tons of molybdenum ore, valued at \$1,275, culled from about 500 or 600 tons of rock taken from the east half of lot 5, concession XIV, Sheffield township, Addington county.

Dr. T. L. Walker, of Toronto, has been examining molybdenum occurrences, with a view to preparing a report on the molybdenum ores of Canada. In 1909 he visited the following localities:—

‘In Nova Scotia I visited nearly all the known deposits—near Jordan falls, Shelburne county; New Ross, Lunenburg county; Glengarry and Gabarus, in Cape Breton. These properties have not been developed.

‘In New Brunswick molybdenite is known to occur, but no attempt has, so far, been made to develop the deposits.

‘In Quebec, where the areas of granite and gneiss are very extensive, a great many occurrences of molybdenite have been recorded, but none of the properties have been fully explored. I examined some of the properties at Romaine and Peaster bays on the north shore of the Gulf of St. Lawrence, and also some of those to the north of the Ottawa river, in Alleyn, Egan, Aldridge, and Calumet townships. The only place where explorations were being carried on was at Romaine, where Lt. Col. John Carson of Montreal, and associates, had a party of about ten men employed.’

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<sup>1</sup> Summary Report, Mines Branch, Department of Mines, 1909.

## PLATINUM.

The chief source of the platinum production in Canada has been the placer gravels of British Columbia, principally in the Similkameen River district. The nickel-copper ores of the Sudbury district also carry small quantities of the metals of the platinum group, and these are now being partly recovered. During 1902, 1903, and 1904, considerable quantities of platinum were recovered from accumulated residues resulting from the treatment of the mattes from Sudbury.

In 1906 there was practically no production of platinum from placer deposits, while the amount of platinum metals recovered from the treatment of the nickel-copper mattes is reported by the Ontario Bureau of Mines to have been 314 ounces valued at \$5,652. This has been tabulated under palladium.

During the past three years there has been no production recorded, either of platinum, or metals of the platinum group.

### Annual Production of Platinum.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1887.....	5,600	1894.....	950	1901.....	457
1888.....	6,000	1895.....	3,800	1902.....	46,502
1889.....	3,500	1896.....	750	1903.....	33,345
1890.....	4,500	1897.....	1,600	1904.....	10,872
1891.....	10,000	1898.....	1,500	1905.....	500
1892.....	3,500	1899.....	825	1906.....	*
1893.....	1,800	1900.....	Nil.		

\*See under Palladium.

### Imports of Platinum.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1883.....	113	1892.....	1,952	1901.....	20,263
1884.....	576	1893.....	14,082	1902.....	19,357
1885.....	792	1894.....	7,151	1903.....	21,251
1886.....	1,154	1895.....	3,937	1904.....	28,112
1887.....	1,422	1896.....	6,185	1905.....	61,719
1888.....	13,475	1897.....	9,031	1906.....	54,494
1889.....	3,167	1898.....	9,781	1907.....	113,485
1890.....	5,215	1899.....	9,671	1908.....	60,390
1891.....	4,055	1900.....	57,910	1909*	45,534

\*Platinum wire and platinum in bars, strips, sheets or plates, platinum retorts, pans, condensers, tubing and pipe, imported by manufacturers of sulphuric acid for use in their works. Duty free.



## PALLADIUM.

It has been known for a long time that palladium is present in the nickel ore of the Sudbury district, but in past years no definite information could be obtained as to whether the metals of the platinum group were saved in the treatment which the ores and mattes underwent. As far back as 1889 it was discovered that sperrylite, the arsenide of platinum, which is present in the Sudbury ores, contained traces of palladium, but the occurrence was noted as being only of mineralogical interest. Of late years, however, the producers of platinum have not been able to supply the demand, and palladium is being considered as a possible substitute on account of its malleability and high melting point (palladium  $1,500^{\circ}\text{C}$ , platinum  $1,750^{\circ}\text{C}$ ).

The metal palladium, as well as platinum, as already explained, has been recovered from the residues resulting from the treatment of the nickel-copper ores of Sudbury, Ont., and statistics of production as obtained by the Ontario Bureau of Mines have been as follows:—

	Ozs.	Value.
1902 Palladium.....	4,411	\$86,014
1903       ".....	3,177	61,952
1904       ".....	952	18,564
1905 Metals of the platinum group .....	1,562	28,116
1906       "       ".....	314	5,652
1907-1909* .....	Nil.	Nil.

\*Ontario Bureau of Mines Report, 1909.

## TIN.

Tin ores have not yet been found in sufficient quantities in Canada to be of economic importance.

The occurrence of tin ore has been reported from several localities, the most important, perhaps, being the recent discovery of cassiterite, near New Ross, Lunenburg county, Nova Scotia. This occurrence has not yet been found of economic value. It has been visited by several officers of the Geological Survey and reports upon it may be found in the Summary Report of the Geological Survey Branch, of the Department of Mines, for 1907, pages 77, and 80 to 83, and in the report for 1908, page 154.

The imports of tin and manufactures thereof into Canada are shown in the following table:—

**Imports of Tin and Tinware.**

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880 .....	281,880	1890 .....	1,289,756	1900 .....	2,418,455
1881 .....	413,924	1891 .....	1,206,918	1901 .....	2,339,109
1882 .....	790,285	1892 .....	1,594,205	1902 .....	2,293,958
1883 .....	1,274,150	1893 .....	1,242,994	1903 .....	2,712,186
1884 .....	1,018,493	1894 .....	1,310,389	1904 .....	2,389,557
1885 .....	1,060,883	1895 .....	973,397	1905 .....	2,791,757
1886 .....	1,117,368	1896 .....	1,237,684	1906 .....	3,336,948
1887 .....	1,187,312	1897 .....	1,274,108	1907 .....	2,719,813
1888 .....	1,164,273	1898 .....	1,550,851	1908 .....	4,059,281
1889 .....	1,243,794	1899 .....	1,372,813	1909 .....	2,985,361

1909	Tin crystals .....	Duty Free.	Pounds.	\$
	Tin in blocks, pig, and bars .....	"	676,260	1,365
	Tin plates and sheets .....	"	10,743,580	980,714
	Tin foil .....	"	715,909	1,682,366
	Tinware, plain, japanned or lithographed, and all manufactures of tin, N.E.S. ....	25 % Free.		85,058
	Tin strip waste .....			235,858
Total .....				2,985,361

## TUNGSTEN.

Reference was made in the report for 1908 to the discovery of scheelite in Halifax county, Nova Scotia. Mr. Faribault, of the Geological Survey, visited this deposit again in the latter part of 1909, to study the character and structure, and a preliminary report thereon will be found in the Summary Report of the Geological Survey for 1909,<sup>1</sup> from which the following reference to general development is taken.

### General Development.

'All the prospecting has been confined, so far, to a comparatively small area, extending 700 feet east and west along the course of the veins and 200 feet across them. This work was all done by the two Reynolds brothers and Currie, and consists mostly of trenching across the strike of the rocks to prove the ground. Some of the veins discovered were traced along their courses for short distances by prospect pits and shallow open-cuts; and on one of them a pit was sunk to a depth of 15 feet. Considering the amount of work done and the limited area covered, the results obtained are very satisfactory.

'Several tons of ore have been produced as a result of the prospecting already done. We are informed that one or two tons have been forwarded to Halifax and elsewhere, for the purpose of experimenting on a practical process of concentration, as well as to determine the best method of producing tungsten acid from concentrates and at the same time eliminating sulphur and arsenic. Although scheelite is richer in tungsten than the other ores of tungsten, wolframite, and hübnerite, it was for a time considered less desirable, owing to the difficulty of its metallurgical treatment; but the modern method of reduction, in the electrical furnace, has rendered it fully as desirable.

'The zone of tungsten veins is probably limited on the north by the north syncline, situated at a distance of about 100 feet north of the middle anticline, and it probably extends some distance farther south than the present developments. Otherwise, the extent of the mineralized zone is not known; but enough veins have been exposed to show the importance of the deposit from an economic point of view. That the area is much larger than might be supposed from the veins exposed by Reynolds and Currie, is shown by the fact that scheelite has been found in drift on the continuation of the same anticline, 900 feet west from Stillwater brook, and in an isolated boulder a mile and a quarter west. Further exploration will no doubt also disclose scheelite veins outside of the known zone, especially towards the south. Scheelite float has also been

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<sup>1</sup> Summary Report Geological Survey, Department of Mines, 1909, pages 228-234.

found 1,350 feet south, on the east side of Stillwater brook where the first discovery was made. This material may have drifted south from the main deposit, or from another group of veins, possibly situated on another minor anticline not yet located.

'Since the discovery of these deposits, scheelite was found 2 miles east, on the same anticline, at the Moose River gold mines, where, on the Touquoy property, at the depth of 200 feet in Kaulbach's vertical shaft on the Dowell lead, pieces of scheelite as large as a hen's egg, in quartz, were brought to the surface at different times; also on the Moose River Gold Mining Company's property, where, at a depth of 90 feet in the Cameron shaft, a pocket was found containing a few pounds of ore.

'As already mentioned, scheelite was discovered last fall by Mr. A. L. McCallum, at a place one mile north of the Waverley gold mines, which are situated on the same anticline, 36 miles west of Moose river. Two or three interbedded quartz veins bearing scheelite similar to those of the Moose River deposit, have been uncovered here, and a quantity, possibly two tons, of ore has been produced.

'Scheelite has, therefore, been found at different places over a stretch of 3 miles along the Moose River anticline, and at another place 36 miles west, on the western continuation of the same great upheaval: indicating, seemingly, the persistence of this system of anticlinal veins, and its possibilities as a good field for further exploration.

'Mr. F. H. Mason, chemist, formerly of Halifax, states that he has often found traces of scheelite in his analyses of the tailings from the Lake Lode mine at Caribou, situated 6 miles north of Moose river on the next main anticline. Professor T. L. Walker reports that concentrates collected at Caribou mines were found, on chemical examination, to contain 0.22 per cent of tungstic acid; and that a sample collected in June, 1908, at the Moose River mill, contained 0.52 per cent tungstic acid.

'Scheelite, of a light, smoky colour, was found in a quartz vein intersecting the Middle Rabbit lead, on the Ballou gold mine, Malaga, Queens county. It is very probable that scheelite occurs in many other gold districts in Nova Scotia, especially in those situated near granite masses, and a systematic search for it over the old dumps and old workings may be rewarded by other important finds.'



## NON-METALLIC PRODUCTS.

### ABRASIVE MATERIALS.

The abrasives produced in Canada comprise: corundum; the various sandstone abrasives, such as grindstones, pulpstones, whetstones, etc.; and tripolite or infusorial earths.

#### CORUNDUM.

The total shipments of grain corundum from operator's mills in 1909 were 2,981,634 pounds, as compared with shipments in 1908 of 2,178,790. Corundum ores are mined in Canada by two companies, in the counties of Renfrew and Hastings respectively, and both mills were in active operation during the past year. A total of 35,894 tons of rock was milled, from which 3,158,300 pounds of grain corundum were graded during 1908. The largest operators shut down their plant during the greater part of the year, though sales and shipments were continued from the large stocks which had been accumulated.

Detailed statistics of output and shipments during the past three years are as follows:—

	1907.	1908.	1909.
Rock treated . . . . .	60,532 tons.	2,678 tons.	35,894 tons.
Grain corundum graded . . . . .	5,365,257 lbs.	212,150 lbs.	3,158,300 lbs.
Shipments—			
Grain corundum sold in Canada . . . . .	328,000 "	198,600 "	258,500 "
"       "    sold in other countries . . . . .	3,457,450 "	1,980,190 "	2,723,134 "
Total sales . . . . .	3,785,450 lbs.	2,178,790 lbs.	2,981,634 lbs.

Corundum is found in Faraday, Dungannon, Monteagle, Carlow, Raglan, and adjacent townships, the operating mines being located in the last two. Mining operations have been in progress since 1900. In the earlier years of the industry, the amount of grain corundum graded averaged about 2 per cent of the rock treated. In more recent years, however, a much lower grade of rock has been milled, the recovery of corundum in 1909 averaging about 4.4 per cent and in 1908 about 3.9 per cent of the rock treated.

The product finds a market in Canada, the United States, England, France, Germany, and Belgium. Descriptions of mines and mills will be found in the Annual Report of the Ontario Bureau of Mines, and in Memoir No. 6, Geological Survey Publications.<sup>1</sup>

<sup>1</sup> The geology of the Haliburton and Bancroft areas, Province of Ontario, by Frank D. Adams and Alfred E. Barlow.

The present operating companies are:—

The Manufacturers Corundum Company, Limited, Craigmont, Ont.

The Ashfield Emery and Corundum Company, Limited, Burgess Mines, Ont.

Statistics of shipments since 1900 are shown as follows:—

Grain Corundum.	Lbs.	Value.	Average Price.
		\$	Cents.
1900.....	6,000	300	5'00
1901.....	773,590	46,415	5'97
1902.....	1,535,730	84,465	5'49
1903 {	1,406,000	77,510	5'51
Tons corundum ore .....	267	2,670	(\$10 00)
1904.....	1,986,290	109,545	5'51
1905.....	3,288,267	149,153	4'48
1906.....	4,548,176	204,973	4'50
1907.....	3,785,450	177,922	4'70
1908.....	2,178,790	100,398	4'60
1909.....	2,981,634	162,492	5'45

Statistics since 1900 showing the quantities of ore treated, the corundum produced, and the sales or shipments in Canada and in other countries are given in Table 1.

ABRASIVE MATERIALS.—TABLE 1.

Production of Corundum Ore and Corundum.

Calendar Year.	Corundum-bearing rock treated.	Grain Corundum Graded.	Grain Corundum sold in Canada.	Grain Corundum Exported.	Total of Grain Corundum.
	Tons.	Tons.	Tons.	Tons.	Tons.
1900.....		60			3
1901.....	4,134	444	85	302	387
1902.....	7,996	806	106	662	768
1903.....	(a) 8,877	839	85	618	703
1904.....	28,187	1,654	116	877	993
1905.....	23,571	1,681	140	1,504	1,644
1906.....	45,719	2,914	162	2,112	2,274
1907.....	60,532	2,682	164	1,728	1,892
1908.....	2,678	106	99	990	1,089
1909.....	35,894	1,579	129	1,362	1,491

(a) In addition to this amount which was milled in Canada, 267 tons of ore were mined and shipped to the United States for treatment there.

GRINDSTONES, PULPSTONES, ETC.

The manufacture of grindstones is an industry which has been carried on for many years in the Provinces of Nova Scotia and New Brunswick. The output to-day is no greater than it was twenty years ago, and there has been comparatively little variation from year to year. The total production, includ-

ing wood pulpstones, etc., in 1909, was 4,275 tons valued at \$54,664; as compared with 3,843 tons valued at \$48,128 in 1908, and 5,414 tons valued at \$60,376 in 1907.

These abrasives are quarried from the Millstone Grit of the Carboniferous formation, which occupies a large portion of the surface of the eastern half of the Province of New Brunswick and the northern and northwestern parts of Nova Scotia.

The localities at which quarrying operations are chiefly carried on are at Lower cove, and Quarry island, near Merigomish, in Nova Scotia, and in New Brunswick on Chaleur bay, and at Woodpoint and Rockport on the Bay of Fundy.

The grindstones are all shipped in a finished condition, and are worth from \$10 to \$12 per ton.

About 240 tons of pulpstones valued at \$6,640 were shipped in 1909, to Canadian pulp and paper mills. These stones weigh about  $2\frac{1}{2}$  tons each and are usually made about 27" face by 54" diameter. About 33 tons of scythe stones, put up in one quarter gross boxes, thirty pounds to the box, were sold at a value of \$50 per ton. At some of the quarries there is a considerable production of foundation and building stone, besides rough stone for breakwater and harbour works.

Most of the pulpstones are made at Renous Bridge, New Brunswick, by the Miramichi Quarry Company. This quarry also produces an excellent building stone, which finds a market in Quebec, Montreal, and Toronto.

Statistics of the production of grindstones by Provinces since 1886 are given in Table 2.

ABRASIVE MATERIALS—TABLE 2.  
Annual Production of Grindstones.

Calendar Year.	NOVA SCOTIA.		NEW BRUNSWICK.		TOTAL.		Average Value per Ton.
	Tons.	Value.	Tons.	Value.	Tons.	Value.	
		\$		\$		\$	\$
1886.....	1,765	24,050	2,255	22,495	4,020	46,545	11 58
1887.....	1,710	25,020	3,582	38,988	5,292	64,008	12 10
1888.....	1,971	20,400	3,793	30,729	5,764	51,129	8 87
1889.....	712	7,128	2,692	23,735	3,404	30,863	9 07
1890.....	850	8,536	4,034	33,804	4,884	42,340	8 67
1891.....	1,980	19,800	2,499	22,787	4,479	42,587	9 51
1892.....	2,462	27,610	2,821	23,577	5,283	51,187	9 69
1893.....	2,112	21,000	2,488	17,379	4,600	38,379	8 34
1894.....	2,128	16,000	1,629	16,717	3,757	32,717	8 71
1895.....	1,400	14,000	2,075	17,932	3,475	31,932	9 19
1896.....	1,450	14,500	2,263	18,810	3,713	33,310	8 97
1897.....	1,407	17,500	3,165	24,840	4,572	42,340	9 26
1898.....	1,422	12,350	3,513	32,425	4,935	44,775	9 07
1899.....	1,378	10,300	3,133	32,965	4,511	43,265	9 59
1900.....	1,411	12,600	4,128	40,850	5,539	53,450	9 65
1901.....	358	3,200	4,223	42,490	4,581	45,690	9 97
1902.....	1,074	8,118	3,559	36,000	4,633	44,118	9 52
1903.....	1,337	9,562	4,201	38,740	5,538	48,302	8 72
1904.....	1,029	7,332	3,620	35,450	4,649	42,782	9 20
1905.....	1,020	10,200	4,520	52,175	5,540	62,375	11 25
1906.....	1,023	9,680	4,340	50,134	5,363	59,814	11 15
1907.....	551	4,480	4,863	55,896	5,414	60,376	11 15
1908.....	473	4,803	3,370	43,325	3,843	48,128	12 52
1909.....	312	3,204	3,963	51,460	4,275	54,664	12 79

The imports of grindstones into Canada, principally into the Provinces of Ontario and Quebec, reached a total value during the calendar year 1909 of \$69,554. The value of the other abrasives imported during the same period includes: burrstones, valued at \$2,001; emery, \$29,752; manufactures of emery, \$66,777; pumice stone, \$11,291; sandpaper, \$124,716; iron sand for glass or granite polishing or for paving stone, \$6,068; a total value of \$310,159.

Statistics of the exports and imports of grindstones and other abrasives are shown in the following tables:—

ABRASIVE MATERIALS.—TABLE 3.  
Exports of Grindstones.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1884.....	28,186	1893.....	21,672	1902*.....	24,489
1885.....	22,606	1894.....	12,579	1903*.....	27,659
1886.....	24,185	1895.....	16,723	1904*.....	35,612
1887.....	28,769	1896.....	19,139	1905*.....	24,868
1888.....	28,176	1897.....	18,807	1906*.....	31,978
1889.....	29,982	1898*.....	25,588	1907.....	32,534
1890.....	18,564	1899*.....	23,288	1908.....	19,721
1891.....	28,433	1900*.....	42,128	1909.....	13,942
1892.....	23,567	1901*.....	29,130		

\* Including stone for the manufacture of grindstones.



## ABRASIVE MATERIALS.—TABLE 4.

## Imports.

Fiscal Year.	GRINDSTONES.		Burrstones. (c) Value.	Emery. (a) Value.	Mfrs. of Emery. (b) Value.	Pumice Stone. (d) Value.
	Tons.	Value.				
		\$	\$	\$	\$	\$
1880.....	1,044	11,714	12,049			
1881.....	1,359	16,895	6,337			
1882.....	2,098	30,664	15,143			
1883.....	2,108	31,456	13,242			
1884.....	2,074	30,471	5,365			
1885.....	1,148	16,065	4,517	5,066	4,920	9,384
1886.....	964	12,803	4,062	11,877	5,832	2,777
1887.....	1,309	14,815	3,545	12,023	4,598	3,594
1888.....	1,721	18,263	4,753	15,674	4,001	2,890
1889.....	2,116	25,564	5,465	13,565	3,948	3,232
1890.....	1,567	20,569	2,506	16,922	5,313	3,003
1891.....	1,381	16,991	2,089	16,179	6,665	3,696
1892.....	1,484	19,761	1,464	17,782	6,492	3,282
1893.....	1,682	20,987	3,552	17,762	5,606	3,798
1894.....	1,918	24,426	3,029	14,433	2,223	4,160
1895.....	1,770	22,834	2,172	14,569	7,775	3,609
1896.....	1,862	26,561	2,049	16,287	11,913	3,721
1897.....	1,521	25,547	1,827	16,318	11,231	2,903
1898.....		22,217	1,813	17,661	15,478	3,829
1899.....		27,476	1,759	21,454	22,343	5,973
1900.....		34,382	1,546	19,312	25,615	5,604
1901.....		39,068	5,762	16,311	22,190	5,516
1902.....		40,838	2,559	14,476	23,892	7,254
1903.....		53,388	586	18,058	22,177	6,152
1904.....		46,039	35	21,626	29,273	6,537
1905.....		49,747	2,607	21,980	33,250	8,447
1906.....		59,627	2,661	21,781	42,080	9,053
1907 (9 months).....		40,780	245	20,498	41,086	5,745
1908.....		65,125	3,396	26,159	57,760	8,917
1909.....		56,692	1,141	25,931	47,700	8,117

(a) Emery in bulk, crushed or ground. Duty free.

(b) Emery and carborundum wheels and manufactures of emery or carborundum.

(c) Burrstones in blocks, rough or unmanufactured, not bound up or prepared by binning into millstones.

(d) Pumice and pumice stone, ground or unground. Duty free.

## TRIPOLITE.

No shipments of tripolite were reported during 1909.

Statistics of shipments in previous years are shown in Table 5.

## ABRASIVE MATERIALS.—TABLE 5.

## Annual Shipments of Tripolite.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1896.....	644	9,960	1903.....	835	16,700
1897.....	15	150	1904.....	320	6,400
1898.....	1,017	16,660	1905.....	200	3,600
1899.....	1,000	15,000	1906.....	Nil.	Nil.
1900.....	336	1,950	1907.....	30	225
1901.....	850	15,300	1908.....	30	195
1902.....	1,052	16,470	1909.....	Nil.	Nil.

## ASBESTOS.

Asbestos is mined in Canada in the Eastern Townships, Province of Quebec, at Black Lake, Thetford, East Broughton, and Danville. Other occurrences of the mineral have been noted, and some shipments were at one time made from the township of Denholm, in the county of Wright, north of the City of Ottawa, but the first mentioned districts are the only localities in which mining is at present being carried on. The mining of asbestos in this region dates from about 1878, and statistics of production since 1880 are shown in tables following. The value of the annual output has grown from less than \$25,000 in 1880 to over \$2,300,000 in 1909, so that next to coal this is now one of the most important of non-metallic mineral products, and supplies a very large proportion of the world's demand.

The industry has been marked during the past year by a number of important consolidations of interests which, from a technical point of view, should result in greater economy in production and an improvement in standardization of the different grades of product.

A revised edition of the special report on asbestos by Fritz Cirkel, published by this Branch, is now in press, and will shortly be ready for issue.

A portion of the output is sufficiently high grade to be shipped as crude; the greater part, however, is crushed and the fibre extracted by special machinery. A uniform system of classification has not yet been adopted by the operating companies, but for statistical purposes the shipments have been classified on a valuation basis, the crude being divided into two classes and the mill fibre into three grades; the short fibred asbestic, and sand being separately classified.

Although the actual shipments of asbestos during 1909, 87,300 tons, valued at \$2,301,775, were somewhat less than those recorded for 1908, 90,773 tons, valued at \$2,573,335, the total output during the past year, nevertheless, showed an increase; since the stock on hand at the end of 1909 was reported as 20,921 tons valued at \$1,179,679, as compared with stocks of 8,669 tons valued at \$598,545 on hand at the close of 1908. Details of the several grades of shipments are given in Table 1.

## ASBESTOS.—TABLE 1.

## Production by Classes, Calendar Years 1908 and 1909.

	1908.			1909.		
	Short Tons.	Value.	Per ton.	Short Tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
Crude, No. 1.....	857½	257,752	300 59	912·3	246,655	270 37
" 2.....	2,488	411,480	165 38	2,162	328,855	152 11
Mill stock, No. 1.....	5,282½	425,448	80 54	14,776	785,731	53 18
" " 2.....	45,545½	1,345,750	29 33	32,417	800,728	24 70
" " 3.....	12,374½	114,931	9 29	13,082	122,618	9 37
Total asbestos.....	66,548	2,555,361	38 40	63,349·3	2,284,857	36 06
Total asbestic.....	24,225	17,974	0 74	23,951	17,188	0 72
Grand total.....	90,773	2,573,335	.....	87,300·3	2,301,775	.....

While the average prices in each class are given in the above, the classification is based approximately on the following maximum and minimum prices per ton.

## Range of Prices of Asbestos during the Years 1907-8-9.

	1907.		1908.		1909.	
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Crude, No. 1.....	225 00 to	300 00	267 00 to	350 00	200 00 to	300 00
" 2.....	100 00 "	200 00	75 00 "	225 00	100 00 "	175 00
Mill stock, No. 1.....	57 00 "	163 00	60 00 "	100 00	45 00 "	100 00
" " 2.....	18 00 "	50 00	20 00 "	50 00	20 00 "	40 00
" " 3.....	8 00 "	15 00	5 00 "	13 00	6 00 "	10 00
Asbestic.....	0 50 "	2 00	0 35 "	1 16	0 35 "	1 28

Details of stock on hand on December 31, 1909 and 1908, are shown as follows:—

## Asbestos Stocks in Producers Hands, December 31.

	1909.		1908.	
	Tons.	\$	Tons.	\$
Crude No. 1.....	1,138	310,417	432	129,450
" 2.....	2,076	324,719	382	72,775
Mill stock No. 1.....	3,791	209,962	2,480	243,534
" 2.....	11,823	317,823	4,205	138,423
" 3.....	2,093	16,758	1,170	14,363
	20,921	1,179,679	8,669	598,545

These figures appear to indicate a production beyond the capacities of the market to absorb, particularly in respect to the higher grade crude product, and there appears to have been a distinctly lower average price obtained for all grades during 1909.

In Table 2, following, the shipments of crude asbestos and mill stocks since 1903 are separately shown. The record indicates that during the past seven years there has been but little variation in the quantity shipped as crude, although the average price has nearly doubled; while on the other hand, the shipments of mill stock have increased over two fold in the same time, with an increase of over 43 per cent in the average price per ton obtained.

ASBESTOS.—TABLE 2.

## Annual Production of Crude and Mill Stock, 1903-1909.

Calendar Year.	CRUDE			MILL STOCK.		
	Short Tons.	Value.	Per ton.	Short Tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ lcts.
1903.....	3,134	361,867	115 46	27,995	554,021	19 79
1904.....	4,410	534,874	121 28	31,201	678,628	21 75
1905.....	3,767	472,859	125 53	46,902	1,013,500	21 61
1906.....	3,841	635,345	165 41	56,920	1,401,083	24 61
1907.....	4,327	830,632	191 97	57,803	1,654,135	28 62
1908.....	3,345.5	669,232	200 94	63,202	1,886,129	29 84
1909.....	3,074.3	575,510	187 20	60,275	1,709,077	28 35



Table 3 shows the total shipments of asbestos and asbestic separately for each year since 1880.

ASBESTOS.—TABLE 3.

## Annual Production since 1880.

Calendar Year.	ASBESTOS.			ASBESTIC.		
	Short Tons.	Value.	Per ton.	Short Tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
1880 (a).....	380	24,700	65 00			
1881 (a).....	540	35,100	65 00			
1882 (a).....	810	52,650	65 00			
1883 (a).....	955	68,750	71 99			
1884 (a).....	1,141	75,097	65 82			
1885 (a).....	2,440	142,441	58 38			
1886 (a).....	3,458	206,251	59 64			
1887.....	4,619	226,976	48 92			
1888.....	4,404	255,007	57 90			
1889.....	6,113	426,554	69 78			
1890.....	9,860	1,260,240	127 81			
1891.....	9,279	999,878	107 76			
1892.....	6,082	390,462	64 20			
1893.....	6,331	310,156	86 81			
1894.....	7,630	420,825	55 15			
1895.....	8,756	368,175	42 05			
1896.....	10,892	423,066	38 84	1,358	6,790	5 00
1897.....	13,202	399,528	29 99	17,240	45,840	2 66
1898.....	16,124	475,131	29 47	7,661	16,066	2 10
1899.....	17,790	468,635	26 34	7,746	17,214	2 22
1900.....	21,621	729,886	33 76	7,520	18,545	2 47
1901.....	32,892	1,248,645	37 96	7,325	11,114	1 52
1902.....	30,219	1,126,688	37 28	10,197	21,631	2 20
1903.....	31,129	915,888	29 42	10,548	13,869	1 31
1904.....	35,611	1,213,502	34 08	12,854	12,850	1 00
1905.....	50,669	1,486,359	29 33	17,594	16,900	0 96
1906.....	60,761	2,036,428	33 52	21,424	23,715	1 11
1907.....	62,130	2,484,767	39 99	28,296	20,275	0 72
1908.....	66,548	2,555,361	38 40	24,225	17,974	0 74
1909.....	63,349 3	2,284,587	36 06	23,951	17,188	0 72

(a) Figures of export taken as production.

## EXPORTS AND IMPORTS.

Supplying as it does the greater part of the world's demand, the Canadian output of asbestos finds a wide distribution.

Exports to Great Britain, United States, Germany, and other countries during the past seven calendar years, as compiled from the Reports of the Customs Department, are shown in Table 4, and the total exports each year since 1892 in Table 5.

Attention has been called to the fact that these figures apparently do not accurately indicate the destination of exports, that Germany, for instance, is a much larger consumer of Canadian asbestos than is shown by these figures. This may possibly be explained by the fact that frequently raw materials of this kind are sold in bond to brokers or dealers in New York and by them resold to consumers in other countries.

## ASBESTOS.—TABLE 4.

## Exports of Canadian Asbestos by Countries, 1903-1909.

Calendar Year	TO GREAT BRITAIN.		TO UNITED STATES.		TO GERMANY.		TO OTHER COUNTRIES.		TOTAL EXPORTS.		Average per ton.
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	
		\$		\$		\$		\$		\$	\$ cts.
1903..	2,743	40,120	24,252	714,781	1,429	25,150	3,356	110,982	31,780	891,033	28 04
1904..	6,602	210,175	25,957	762,300	2,463	94,141	2,250	94,271	37,272	1,160,887	31 15
1905..	9,731	305,056	29,696	811,080	2,969	100,061	4,635	169,918	47,031	1,386,115	29 47
1906..	9,435	318,313	39,767	1,058,513	3,654	82,117	6,998	230,314	59,854	1,689,257	28 22
1907..	5,432	200,909	44,861	1,312,582	225	8,195	6,235	147,613	56,753	1,669,299	29 41
1908..	5,221	288,290	50,503	1,314,337	341	9,470	5,145	230,666	61,210	1,842,763	30 11
1909..	5,227	204,978	45,675	1,243,795	693	17,706	5,376	263,378	56,971	1,729,857	30 36

## ASBESTOS.—TABLE 5.

## Annual Exports, Calendar Years 1892-1909.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
		\$	\$ cts.			\$	\$ cts.
1892.....	5,380	373,103	69 35	1901.....	32,269	1,069,918	33 16
1893.....	5,917	338,707	57 24	1902.....	31,074	995,071	32 02
1894.....	7,987	477,837	59 82	1903.....	31,780	891,033	28 04
1895.....	7,442	421,690	56 66	1904.....	37,272	1,160,887	31 14
1896.....	11,842	567,967	47 96	1905.....	47,031	1,386,115	29 47
1897.....	15,570	473,274	30 40	1906.....	59,854	1,689,257	28 22
1898.....	15,346	494,012	32 19	1907.....	56,753	1,669,299	29 41
1899.....	17,883	473,148	26 46	1908.....	61,210	1,842,763	30 11
1900.....	16,993	693,105	39 61	1909.....	56,971	1,729,857	30 36

Although the chief source for the raw material, Canada does not yet manufacture all the asbestos goods required for home consumption. There is, therefore, a considerable importation of asbestos goods under the import classification, 'Asbestos in any form other than crude and all manufactures of' the duty being 25 per cent. The annual value of the imports is shown in Table 6.

## ASBESTOS.—TABLE 6.

## Imports Fiscal Years 1885-1909.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1885.....	674	1894.....	20,021	1903.....	75,465
1886.....	6,831	1895.....	26,094	1904.....	83,827
1887.....	7,836	1896.....	23,900	1905.....	116,836
1888.....	8,793	1897.....	19,032	1906.....	137,974
1889.....	9,943	1898.....	26,389	1907 (9 months) ..	127,509
1890.....	13,250	1899.....	32,607	1908.....	190,980
1891.....	13,298	1900.....	43,455	*1909.....	180,598
1892.....	14,090	1901.....	50,829		
1893.....	19,181	1902.....	52,464		

\* Asbestos in any form other than crude, and all manufactures of. Duty 25 per cent.

The imports of asbestos into the United Kingdom will be of interest as indicating the possible market in that country for this product.

These imports and the source of supply are shown as follows:—

**Imports of Raw Asbestos into the United Kingdom, 1907-1909.**

Country.	1907.		1908.		1909.	
	Short Tons.	Value	Short Tons.	Value.	Short Tons.	Value.
		\$		\$		\$
Russia .....	1,545	143,708	1,162	123,146	599	71,063
Germany .....	290	39,318	309	40,243	351	48,681
Portuguese East Africa .....	84	17,199	258	39,678	324	56,526
Italy .....	176	27,764	169	26,961	215	38,369
United States .....	543	21,462	1,122	42,150	1,549	49,549
Other foreign countries .....	136	15,271	149	17,340	167	12,410
Total foreign .....	2,774	264,722	3,229	289,518	3,205	267,598
Cape of Good Hope .....	33	2,360	272	17,389	424	30,519
Natal .....	52	10,950	26	4,667	78	9,247
Canada .....	4,408	214,382	3,760	194,691	2,727	144,691
Other British possessions .....	10	759	89	12,507	43	5,596
Total British possessions .....	4,503	228,451	4,147	229,254	3,272	190,053
Grand Total .....	7,277	493,173	7,376	518,772	6,477	457,651

ASBESTOS.—TABLE 7.

**World's Production, 1903-1909, in Metric Tons (2204.6 lbs.).**

	1903	1904	1905	1906	1907	1908	1909
Canada (b) .....	28,240	32,306	45,967	55,122	56,364	60,372	57,470
United States (c) .....	805	1,343	2,820	1,538	592	849	*
Russia (e) .....	5,624	7,502	7,266	9,201	10,430	9,835	13,343
Cape Colony (e) .....	(g) 276	373	454	473	548	1,149	*
Cyprus (e) .....				(g) 19	(g) 89	472	*
Rhodesia (f) .....						50	247
West Australia .....						41	*

\* Figures not available.

(b) Mines Branch, Ottawa.  
London.

(c) United States, Geological Survey.  
(g) Exported. (f) Chamber of Mines, Bulawayo.

(e) Home Office,

The following is a list of the principal asbestos companies in Canada:—

Name of Operator.	Location of Mine.	Address.
Amalgamated Asbestos Corporation Ltd .....	Coleraine, Thetford..	Montreal, 263 St. James St.
Black Lake Consolidated Asbestos Co. ....	Coleraine. ....	Montreal.
Megantic Mining Company. ....	Coleraine. ....	Montreal, 88 McGill St.
Johnston's Asbestos Co. Ltd. ....	Thetford, Black Lake	Thetford Mines, Que.
Bell Asbestos Mine. ....	Thetford. ....	" "
Robertson Asbestos Mining Co. ....	" .....	" " "
Jacob's Asbestos Mining Co. Ltd. ....	" .....	" " West.
The B. & A. Asbestos Co. ....	" .....	Robertsonville, Que.
The Berlin Asbestos Co. ....	" .....	Robertson Sta., Que.
The Asbestos & Asbestic Co. Ltd. ....	Shipton. ....	Asbestic, Que.
Broughton Asbestos Fibre Co. ....	Broughton. ....	East Broughton Sta., Que.
Eastern Townships Asbestos Co. ....	" .....	" "
The Frontenac Asbestos Mining Co. Ltd. ....	" .....	" "
Boston Asbestos Co. Ltd. ....	" .....	" "
The Ling Asbestos Co. ....	" .....	" "
La Compagnie L'Amiante Champlain. ....	" East. ....	Quebec, 81 Rue St. Pierre.
Brompton Lake Asbestos Co. ....	Brompton lake. ....	Montreal, 17 Victoria Sq.
W. H. Lambly. ....	.....	Inverness, Que.



## CHROMITE.

The shipments of chromite during 1909 were returned as 2,470 tons, valued at \$26,604; as compared with shipments during 1908 of 7,225 tons, valued at \$82,008.

The production has shown a considerable falling off in 1909 as compared with previous years, although considerable development work was in progress, which may result in a larger production in 1910.

The plant and properties of the Thetford Chrome Company, lot 16, range A, Coleraine, were taken over by the Chrome and Asbestos Mines, Limited, and preparations were being made for operations on a large scale in 1910. A complete new mill of Behrend concentrators was established.

Statistics of production since 1886 are shown in Table 1 following, the total during the last seven years being divided into high and low grade. Material classed as high grade includes both ore and concentrates ranging from 48 per cent to 50 per cent  $\text{Cr}_2\text{O}_3$ , and higher, while the low grade is composed chiefly of the crude ore.

**CHROMITE.—TABLE 1.**  
**Annual Production in Canada, 1886-1909.**

Calendar Year.	HIGH GRADE			LOW GRADE			TOTALS.		
	Short Tons.	Value.	Average Prices.	Short Tons.	Value.	Average Prices.	Short Tons.	Value.	Average Prices.
		\$	\$ cts.		\$	\$ cts.		\$	\$ cts.
1886							60	945	15 75
1887							38	570	15 00
1888 to							No Output {		
1893									
1894							1,000	20,000	20 00
1895							3,177	41,300	13 00
1896							2,342	27,004	11 53
1897							2,637	32,474	12 31
1898							2,021	24,252	12 00
1899							2,010	21,842	10 86
1900							2,335	27,000	11 56
1901							1,274	16,744	13 14
1902							900	13,000	14 44
1903	2,842	44,280	15 58	667	6,849	10 27	3,509	51,129	14 57
1904	4,650	53,976	16 08	1,424	13,170	9 25	6,074	67,146	11 05
1905				8,575	93,301	10 88	8,575	93,301	10 88
1906	4,975	57,484	11 55	4,060	34,375	8 47	9,035	91,859	10 17
1907	3,545	41,931	11 83	3,651	30,970	8 48	7,196	72,901	10 13
1908	3,472	45,300	13 05	3,753	36,708	9 78	7,225	82,008	11 35
1909	54	720	13 33	2,416	25,884	10 71	2,470	26,604	10 77

The chromite finds its chief market in the United States, although a few carloads are occasionally shipped to Canadian points.

The exports during the calendar year 1909 are reported as 1,794 tons valued at \$20,858.

The following table shows the quantity and value of Canadian chromite imported into the United States during the past six years:—

**Imports of Chromite into the United States from Canada.<sup>1</sup>**

Twelve months ending June 30.	Short Tons.	Value.	Twelve months ending June 30.	Short Tons.	Value.
		\$			\$
1904.....	2,790	36,322	1907.....	6,179	66,115
1905.....	6,489	70,934	1908.....	6,505	69,009
1906.....	9,951	107,580	1909.....	4,455	50,042

<sup>1</sup>The Foreign Commerce and Navigation of the United States, Washington. Long ton in original changed to short ton.

Chrome iron ore is used chiefly for the manufacture of ferro-chrome alloys, and chromium salts for pigments, and is also used for linings in steel and copper furnaces.

Prices in New York in 1907 and 1908 were practically uniform, ranging from \$17 to \$20 per long ton for 50 per cent ore.

During the first five months of 1909, prices had practically the same range, viz., from \$17.50 to \$20; but in June the market dropped, and until the close of the year, chrome ore was quoted at from \$14 to \$16 per long ton for 50 per cent ore in New York.

As an illustration of the market for chromite in the United States, the imports into that country during the past two years are shown in the following table. The record shows a large decrease in import in 1909.

**CHROMITE.—TABLE 2.**

**Imports into the United States, years ending June 30, 1908 and 1909, in tons of 2,240 lbs.<sup>1</sup>**

	1908			1909		
	Long Tons.	Value.	Per Ton.	Long Tons.	Value.	Per Ton.
		\$	\$		\$	\$
Belgium.....	197	2,492	12 65	2,018	28,649	14 20
Canada.....	5,808	69,009	11 88	3,978	50,042	12 58
France.....	468	7,776	16 39			
French Oceania....	20,458	221,460	10 82	11,878	125,728	10 58
Germany.....		20				
Greece.....	9,921	136,996	13 81	3,500	33,214	9 49
India.....	35	357	10 20	,350	1,005	2 87
Italy.....				459	6,932	15 10
Japan.....				2,781	20,529	7 38
Portuguese Africa..	2,200	32,600	14 82	4,042	63,926	15 82
Turkey in Asia....	439	5,312	12 10			
United Kingdom..	4,336	57,719	13 31	786	10,559	13 43
Totals.....	43,862	533,600	12 17	29,792	340,584	11 43

\* The Foreign Commerce and Navigation of the United States, 1908 and 1909.

## CHROMITE.—TABLE 3.

## World's Production of Chromite in Metric Tons (2,204.6 lbs.).

Locality.	1904	1905	1906	1907	1908	1909
Australia (a).....	403	53	15	30	.....	*
Bosnia and Herzegovina (a).....	278	186	320	310	500	*
Canada (d).....	5,510	7,779	8,196	6,528	6,554	2,241
Greece (a).....	6,530	8,900	11,530	11,730	4,350	*
India (a).....	.....	2,751	4,445	18,597	4,821	*
New Caledonia (Production.....)	(a) 47,247	(a) 76,933	(b) 84,241	(b) 3,800	(a) 15,800	*
" (Exports.....)	(b) 42,437	(b) 51,374	(a) 57,367	(c) 31,552	(c) 46,309	*
Rhodesia.....	.....	Nil.	3,308	7,273	(c) 12,118	(c) 23,243
Russia (a).....	26,575	27,047	16,976	26,357	*	*
Norway (a).....	154	Nil.	Nil.	Nil.	Nil.	*
United States (f).....	125	22	109	295	365	*
Turkey (g).....	No complete statistics available.					

\* Statistics not yet available.

(a) Home Office, London.

(b) L'Industrie Minière, Paris.

(c) Mineral Industry, New York, 1908.

(d) Department of Mines, Ottawa.

(e) Rhodesia "Chamber of Mines".

(f) Geological Survey, United States.

(g) Turkey is one of the most important producers of chromite, the ore being found in many parts of both European and Asiatic Turkey. Unfortunately no complete records of production are available. According to statistics collected and published by the Home Office, the exports from several ports during the years 1903 to 1908 were as follows, in metric tons:—

—	1904.	1905.	1906.	1907.	1908.
Salonica.....	8,000	5,700	5,600	4,900	2,100
Kosovo.....	3,100	3,000	4,100	2,800	1,300
Derendje and Marmora ports.....	12,000	12,000	13,000	12,000	12,000
	to	to	.....	to	to
	15,000	15,000	.....	14,000	14,000
Smymna.....	838	.....	1,080	.....	443
Adana.....	To value	.....	.....	.....	.....
	of £500	£2,824	.....	£1,000	.....
Adalia.....	.....	.....	.....	700	.....

## COAL.

The coal mining industry was marked during 1909 by a decreased production in Nova Scotia and an increased production in the western provinces, resulting in an aggregate decrease for the whole of Canada of 384,836 tons, or about 3½ per cent.

This is the first year in fourteen in which a decrease has to be recorded in comparing with the previous year's output, and had it not been for the strike of coal miners, which began at Sydney on July 6, and at Springhill, N.S., on August 10, and continued throughout the year, it is fairly certain that the production would have shown an increase instead of a decrease.

The total production in 1909 was returned as 10,501,475 tons, valued at \$24,781,236; as compared with a production of 10,886,311 tons, valued at \$25,194,573, in 1908.

Coal mining has been for a number of years the most important of Canada's mining industries, and in 1909 is credited with 27 per cent of the total mineral production of the country. As would be expected in a young country rapidly growing in population and industrial activity and endowed with large coal resources, the increase in production has been very rapid. The output in 1909 is more than twice that of ten years ago, about four times the output of twenty years ago, and nearly ten times the production of 1879. The total production during the ten year period, 1880-1889, was 20,399,426 tons, and during the next ten years, 1890-1899, the total production was 37,689,071 tons, or an increase of 84.8 per cent. During the last ten year period, 1900-1909, the total production was 86,275,045 tons, or an increase of 128.9 per cent over the previous ten year aggregate.

Notwithstanding our large coal resources, Canada's total coal production in 1909 was only about 56.4 per cent of the estimated consumption, and our additional requirements are supplied by imports chiefly from the United States. The principal coal fields are located on the extreme east and west, while the central Provinces of Ontario and Quebec, comprising the great bulk of the population, are without coal deposits. Some inferior lignites are known in northern Ontario, but are not commercially available. Nova Scotia coal finds a considerable market in Quebec province, while the demands of Ontario, for both domestic and industrial purposes, are supplied from the south. There are no anthracite coals in eastern Canada, and our requirements of this fuel have to be met entirely by imports from Pennsylvania. The product of British Columbia and Alberta mines not only supplies local demands, including a growing ore smelting industry, but is also largely exported to the adjacent United States.



The coal mined in Canada comprises the three varieties: anthracite, bituminous, and lignite. The bituminous forms by far the largest proportion of the output, being mined exclusively in the Maritime Provinces, in British Columbia, and in the Crowsnest Pass region of southwestern Alberta. It is, of course, difficult to draw any sharp lines of demarcation between the different varieties, but roughly speaking, about 90 per cent of the production may be classed as bituminous.

There is but one anthracite mine in Canada, at Bankhead, near Banff, Alberta, operated by the Bankhead Mines, Limited. This mine possesses the only briquetting plant in operation in the country.

Statistics of the production by provinces during the past three years are shown in Table 1, and Table 2 shows the increases or decreases in each year as compared with the previous year.

It may be explained that the term production in these tables applies to the amount of coal actually sold or used by the producers, in contradistinction to output, which applies to the coal extracted from the mine and which in some cases includes coal lost or unsaleable or coal carried into stock on hand at the end of the year.

COAL.—TABLE 1.

Production by Provinces, 1907-8-9, in tons of 2,000 lbs.

Province.	1907.		1908.		1909.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
Nova Scotia. ....	6,354,133	\$12,764,999	6,652,539	\$13,364,476	5,652,089	\$11,354,643
British Columbia...	2,364,898	7,390,306	2,333,708	7,292,838	2,606,127	8,144,147
Alberta.....	1,591,579	3,836,286	1,685,661	4,127,311	1,994,741	4,838,109
Saskatchewan.....	151,232	252,437	150,556	253,790	192,125	296,339
New Brunswick...	34,584	77,814	60,000	135,000	49,029	98,496
Yukon Territory...	15,000	60,000	3,847	21,158	7,364	49,502
Totals.....	10,511,426	24,381,842	10,886,311	25,194,573	10,501,475	24,781,236

COAL.—TABLE 2.

Comparison of Production, 1907 with 1908, and 1908 with 1909.

Province.	(i) INCREASE OR (d) DECREASE.			
	Years 1907 and 1908.		Years 1908 and 1909.	
	Tons.	Per cent.	Tons.	Per cent.
Nova Scotia.....	(i) 298,406	4·70	(d) 1,000,450	15·04
British Columbia.....	(d) 31,190	1·32	(i) 272,419	11·67
Alberta.....	(i) 94,082	5·91	(i) 309,080	18·34
Saskatchewan.....	(d) 676	0·01	(i) 41,569	27·61
New Brunswick.....	(i) 25,416	73·49	(d) 10,971	18·29
Yukon Territory.....	(d) 11,153	74·35	(i) 3,517	91·42
Totals for Canada.....	(i) 374,885	3·56	(d) 384,836	3·535



The distribution of coal mined, as shown by the returns furnished by the operators, is given for the past three years in the next table.

In 1909, about 82.6 per cent of the total output was placed directly on the market, 7.1 per cent made into coke by the mine operators, and 8.8 per cent used in colliery consumption and by workmen. The quantities entered as loss due to washing, breakage, etc., do not necessarily include all the losses due to these causes, since many companies do not make any return under this heading. Also the quantity entered as sold in Canada probably includes a small quantity which is ultimately exported.

### Distribution of Coal mined in Canada during the Years 1907-8-9.

	1907.	1908.	1909.
Sales in Canada.....	7,358,135	7,715,203	7,468,880
Sales for export to United States.....	1,514,182	1,218,676	1,173,772
" " other countries.....	129,957	297,291	171,388
Total sales.....	9,002,274	9,231,150	8,814,040
Used by producers for the manufacture of coke.....	751,967	708,674	752,976
" " colliery consumption and workmen.....	757,185	946,487	934,459
Stock on hand January 1.....	212,559	183,443	202,432
" December 31.....	190,224	230,335	219,569
Difference.....	- 22,335	+ 46,892	+ 17,137
Loss due to washing, breakage, or other causes.....	351,783	157,610	154,162
Total output.....	10,840,874	11,090,813	10,672,774

The output by provinces, showing the distribution of coal mined in 1909, is shown in the next table.

### Coal Output in Canada, 1909.

	Nova Scotia.	New Brunswick.	Saskatchewan.	Alberta.	Yukon.	British Columbia.	Total Output.*
Sales in Canada.....	4,496,688	45,000	183,878	1,639,515	6,864	1,096,935	7,468,880
Sales for export to U. S. . . . .	300,134			114,101		759,537	1,173,772
" " other countries.....	100,258					71,130	171,388
Total sales.....	4,897,080	45,000	183,878	1,753,616	6,864	1,927,602	8,814,040
Used by producers in making coke.....	169,832			143,854		439,290	752,976
Used by producers for colliery consumption and workmen.....	585,177	4,029	8,247	97,271	500	239,235	934,459
Stock on hand Jan. 1.....	150,455			4,646		47,331	202,432
" Dec. 31.....	154,832			12,150		52,587	219,569
Difference.....	+ 4,377			+ 7,504		+ 5,256	+ 17,137
Losses due to breakage or other causes.....	62,405		10,788	17,573		63,396	154,162
Total output.....	5,718,871	49,029	202,913	2,019,818	7,364	2,674,779	10,672,774

\* Production is obtained by adding coal sold and coal used.

Statistics of the annual production of coal in Canada since 1874 are shown in Table 3. The total production from 1785 to 1909 has been 159,249,386 tons, of which 109,327,053 tons, or 69 per cent, are to be credited to Nova Scotia, and 36,718,469 tons, or 23 per cent, to British Columbia.

COAL.—TABLE 3.

## Annual Production showing the Increase or Decrease each year.

Year.	Tons.	Value.	Average Value per Ton.	Increase (i) or Decrease (d) in Tonnage.	Increase (i) or Decrease (d) per cent.
		\$	\$		
1785 to 1873.....	*8,534,455				
1874.....	1,063,742	1,763,423	1 66		
1875.....	1,039,974	1,747,016	1 68	(d) 23,768	(d) 2.2
1876.....	994,762	1,729,546	1 74	(d) 45,212	(d) 4.3
1877.....	1,036,670	1,794,415	1 73	(i) 41,908	(i) 4.2
1878.....	1,089,744	1,941,285	1 78	(i) 53,074	(i) 5.1
1879.....	1,126,497	2,050,639	1 82	(i) 36,753	(i) 3.4
1880.....	1,482,714	2,657,194	1 79	(i) 356,217	(i) 31.6
1881.....	1,537,106	2,688,621	1 75	(i) 54,392	(i) 3.7
1882.....	1,848,148	3,248,446	1 76	(i) 311,042	(i) 20.2
1883.....	1,818,684	3,109,635	1 71	(d) 29,464	(d) 1.6
1884.....	1,984,959	3,593,831	1 81	(i) 166,275	(i) 9.1
1885.....	1,920,977	3,417,807	1 78	(d) 63,982	(d) 3.2
1886.....	2,116,653	3,739,840	1 77	(i) 195,676	(i) 10.2
1887.....	2,429,330	4,388,206	1 81	(i) 312,677	(i) 14.8
1888.....	2,602,552	4,674,140	1 80	(i) 173,222	(i) 7.1
1889.....	2,658,303	4,894,287	1 84	(i) 55,751	(i) 2.1
1890.....	3,084,682	5,676,247	1 84	(i) 426,379	(i) 16.0
1891.....	3,577,749	7,019,425	1 96	(i) 493,067	(i) 16.0
1892.....	3,287,745	6,363,757	1 94	(d) 290,004	(d) 8.1
1893.....	3,783,499	7,359,080	1 95	(i) 495,754	(i) 15.1
1894.....	3,847,070	7,429,468	1 93	(i) 63,571	(i) 1.7
1895.....	3,478,344	6,739,153	1 94	(d) 368,726	(d) 9.6
1896.....	3,745,716	7,226,462	1 93	(i) 267,372	(i) 7.7
1897.....	3,786,107	7,303,597	1 93	(i) 40,391	(i) 1.1
1898.....	4,173,108	8,224,288	1 97	(i) 387,001	(i) 10.2
1899.....	4,925,051	10,283,497	2 09	(i) 751,943	(i) 18.0
1900.....	5,777,319	13,742,178	2 38	(i) 852,268	(i) 17.3
1901.....	6,486,325	12,699,243	1 96	(i) 709,006	(i) 12.3
1902.....	7,466,681	15,210,877	2 04	(i) 780,356	(i) 15.1
1903.....	7,960,364	15,942,833	2 00	(i) 493,683	(i) 6.6
1904.....	8,254,595	16,592,231	2 01	(i) 294,231	(i) 3.7
1905.....	8,667,948	17,520,263	2 02	(i) 413,353	(i) 5.0
1906.....	9,762,601	19,732,019	2 02	(i) 1,094,653	(i) 12.6
1907.....	10,511,426	24,381,842	2 32	(i) 748,825	(i) 7.7
1908.....	10,886,311	25,194,573	2 32	(i) 374,885	(i) 3.5
1909.....	10,501,475	25,781,236	2 36	(d) 384,836	(d) 3.5

\* The total production for the years 1785 to 1873 is made up as follows:—

Nova Scotia (1785 to 1873) . . . . . 8,053,670 tons of 2,000 pounds.  
 British Columbia (1836 to 1873) . . . . . 480,785 " 2,000 "

The following table shows the proportional contributions of each province to the grand total production of Canada in 1874, 1890, and yearly since 1900:—

Province.	1874.	1890.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.
	%	%	%	%	%	%	%	%	%	%	%	%
Nova Scotia.....	91	71	62·9	64·4	69·4	71·3	68·0	65·5	64·07	60·79	61·40	54·29
New Brunswick ..												
Saskatchewan*			0·7	0·7	0·9	1·5	1·5	1·2	1·11	1·44	1·37	1·83
Alberta*		4	5·4	5·2	5·4	6·2	8·0	10·8	12·77	15·14	15·42	18·99
British Columbia ..	8	25	31·0	29·6	24·2	21·0	22·5	22·4	21·98	22·50	21·77	24·82
Yukon Territory.....				0·1	0·1			0·1	0·07	0·13	0·04	0·07

\* Alberta and Saskatchewan were established as provinces on September 1, 1905. For the purpose of comparison, the coal production during the years previous to that date has been separated according to the present boundaries of these Provinces.

The figures of the above table bring out the steady growth of the coal industry in the Provinces of Alberta and Saskatchewan. In 1900, these two Provinces were only contributing a little over 6 per cent, whereas in 1909 their aggregate production represents nearly 21 per cent of the total production in Canada.

The proportion contributed by Nova Scotia, although still more than half the total, has fallen considerably during the past ten years, and it will probably be but a short time before the production in the west exceeds that in the east.

### EXPORTS AND IMPORTS.

The following tables give the statistics of exports of coal from Canada, as compiled from the reports of the Department of Customs. The United States constitutes the main market for coal exported, 78 per cent of the exports being sent to that country in 1909. The total exports of Canadian coal during 1909 were the smallest since 1904.

#### Exports of Coal produced in Canada during 1907-8-9.

Exported to	1907.		1908.		1909.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
Great Britain.....	8,514	25,106	5,557	18,065	10,671	36,403
United States.....	1,691,016	4,278,870	1,385,223	3,564,390	1,240,519	3,357,111
Newfoundland.....	131,784	357,005	194,034	532,121	175,801	493,040
Other countries .....	62,760	218,583	145,019	546,801	161,108	569,788
Totals .....	1,894,074	4,879,564	1,729,833	4,661,377	1,588,099	4,456,342

COAL.—TABLE 4.

## Exports.

Calendar Year.	Produce of Canada.	Not the Produce of Canada.	Calendar Year.	Produce of Canada.	Not the Produce of Canada.
	Tons.	Tons.		Tons.	Tons.
1873.....	420,683	5,403	1892.....	823,733	93,988
1874.....	310,988	12,859	1893.....	960,312	102,827
1875.....	250,348	14,026	1894.....	1,103,694	89,786
1876.....	248,638	4,995	1895.....	1,011,235	96,836
1877.....	301,317	4,829	1896.....	1,106,661	116,774
1878.....	327,959	5,468	1897.....	986,130	101,848
1879.....	306,648	8,468	1898.....	1,150,029	99,189
1880.....	432,188	14,217	1899.....	1,293,169	101,004
1881.....	395,382	14,245	1900.....	1,787,777	62,776
1882.....	412,682	37,576	1901.....	1,573,661	53,894
1883.....	486,811	44,388	1902.....	2,090,268	23,453
1884.....	474,405	62,665	1903.....	1,954,629	27,138
1885.....	427,937	71,003	1904.....	1,557,412	27,308
1886.....	520,703	78,443	1905.....	1,635,287	86,792
1887.....	580,965	89,098	1906.....	1,835,041	44,758
1888.....	588,627	84,316	1907.....	1,894,074	101,778
1889.....	665,315	89,294	1908.....	1,729,833	102,071
1890.....	724,486	82,534	1909.....	1,588,099	161,098
1891.....	971,259	77,827			

The exports from Nova Scotia and British Columbia are shown separately in Table 5 up to 1899, but the Customs reports do not now give these details.

According to direct returns from the operators, Nova Scotia coal sold for export in 1909 amounted to 400,392 tons, and British Columbia coal, 830,667 tons.

## COAL.—TABLE 5.

## Exports: Nova Scotia and British Columbia.

Calendar Year.	NOVA SCOTIA.		*BRITISH COLUMBIA.	
	Tons.	Value.	Tons.	Value.
		\$		\$
1874.....	252,124	647,539	51,001	278,180
1875.....	179,626	404,351	65,842	356,018
1876.....	126,520	263,543	116,910	627,754
1877.....	173,389	352,453	118,252	590,263
1878.....	154,114	293,795	165,734	698,870
1879.....	113,742	203,407	186,094	608,845
1880.....	199,552	344,148	219,878	775,008
1881.....	193,081	311,721	187,791	622,965
1882.....	216,954	390,121	179,552	628,437
1883.....	192,795	336,088	271,214	946,271
1884.....	222,709	430,330	245,478	901,440
1885.....	176,287	349,650	250,191	1,000,764
1886.....	240,459	441,693	274,446	960,649
1887.....	207,941	390,738	356,657	1,262,552
1888.....	165,863	330,115	405,071	1,605,650
1889.....	186,608	396,830	470,683	1,918,263
1890.....	202,387	426,070	508,882	1,977,191
1891.....	194,867	417,816	767,734	2,958,695
1892.....	181,547	407,980	599,716	2,317,734
1893.....	203,198	470,695	708,228	2,693,747
1894.....	310,277	633,398	770,439	2,855,216
1895.....	241,091	534,479	728,283	2,692,562
1896.....	380,149	787,270	679,799	2,507,752
1897.....	307,128	642,754	630,341	2,221,737
1898.....	309,158	629,363	813,843	2,948,428
1899†.....	459,260	827,941	781,809	2,947,369

\* See foot-note, Table 15. † Since 1899, exports by provinces have not been published in Trade and Navigation report.

The imports of coal into Canada are shown in Table 6. Anthracite dust is included with the anthracite coal, but bituminous dust is classified as 'bituminous slack such as will pass through a  $\frac{3}{4}$ " screen.' The imports of anthracite and bituminous were both less in 1909 than in 1908, but there was a slight increase in the imports of bituminous dust.



The total imports aggregated 9,872,924 tons, valued at \$26,831,859, an amount almost equal to the home production.

COAL.—TABLE 6.

## Imports of Coal into Canada.

BITUMINOUS COAL.			ANTHRACITE COAL AND ANTHRACITE DUST.		BITUMINOUS COAL DUST.	
Fiscal Year.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
1880.....	457,049	1,220,761	516,729	1,509,960	3,565	8,877
1881.....	587,024	1,741,568	572,092	2,325,937	337	666
1882.....	636,374	1,992,081	633,273	2,666,356	471	900
1883.....	911,629	2,996,198	754,891	3,344,936	8,154	10,082
1884.....	1,118,615	3,613,470	868,000	3,831,283	12,782	14,600
1885.....	1,011,875	3,197,539	910,324	3,909,844	20,185	20,412
1886.....	930,949	2,591,554	995,425	4,028,050	36,230	36,996
1887.....	1,149,792	3,126,225	1,100,165	4,423,062	31,401	33,178
1888.....	1,231,234	3,451,661	+ 2,138,627	5,291,875	28,808	34,730
1889.....	1,248,540	3,255,171	1,291,705	5,199,481	39,980	47,139
1890.....	1,409,282	3,528,959	1,201,335	4,595,727	53,104	29,818
1891.....	1,598,855	4,060,896	1,399,067	5,224,452	60,127	36,130
1892.....	1,615,220	4,099,221	1,479,106	5,640,346	82,091	39,840
1893.....	1,603,154	3,967,764	1,500,550	6,355,285	109,585	44,474
1894.....	1,359,509	3,315,094	1,530,522	6,354,040	117,573	49,510
1895.....	1,444,928	3,321,387	1,404,342	5,350,627	181,318	52,221
1896.....	1,538,489	3,299,025	1,574,355	5,667,096	210,386	53,742
1897.....	1,543,476	3,254,217	1,457,295	5,695,168	225,562	59,609
1898.....	1,684,024	3,179,595	1,460,701	5,874,685	229,445	45,556
1899.....	2,171,358	3,691,946	1,745,460	6,490,509	276,547	44,717
1900.....	2,439,764	4,310,964	1,654,401	6,602,912	330,174	98,349
1901.....	2,516,392	4,956,025	1,933,283	7,923,950	414,432	275,559
1902.....	3,047,392	5,712,058	1,652,451	7,021,939	489,548	264,550
1903.....	3,511,412	7,776,717	1,456,713	7,028,664	550,883	420,317
1904.....	4,053,900	9,108,208	2,275,018	10,461,223	608,041	544,128
1905.....	4,176,274	8,002,896	2,604,137	12,093,371	650,261	343,456
1906.....	4,495,550	8,360,348	2,200,863	10,304,308	747,251	489,180
Calendar Year.	Bituminous round and run of mine.				Bituminous slack such as will pass through a 3" screen.	
1907.....	6,370,152	13,232,445	3,141,873	14,506,129	1,139,256	1,219,949
1908.....	(a) 6,025,574	12,516,748	(b) 3,160,110	14,478,536	(c) 1,111,811	1,355,677
1909.....	5,625,063	11,455,818	3,017,844	13,906,152	1,230,017	1,469,889

(a). Duty, 53c. per ton. (b). Coal, anthracite, and anthracite coal dust; duty free. (c). Duty 20 per cent, not over 13c. per ton.

† In the anthracite column the imports show a very considerable increase in 1888 over 1887, an increase of over 94 per cent, the falling off again in 1889 being quite as remarkable. The average values per ton for the three years 1887, 1888, and 1889, were \$4.02, \$2.47, and \$4.03 respectively. Although a duty of 50c. per ton on anthracite coal was removed May 13, 1887, it is hardly thought this would account for the changes indicated, and unless some error may possibly have crept into the Trade and Navigation report, no explanation is available.

With statistics of production, exports, and imports of coal available, a basis is furnished for an estimate of the country's coal consumption. The consumption in 1909 amounted to 18,625,202 tons, as compared with 19,351,902 tons in 1908, a decrease of 726,700 tons, or 3.76 per cent. Of the total consumption in 1909, 9,711,826 tons, or 52.1 per cent, were imported coal, and 8,913,376 tons, or 47.9 per cent domestic coal.

The per capita consumption in 1909, based on an estimate of the population made by the Census Office, was approximately 2.599 tons; this is somewhat less than the per capita consumption of the two previous years. During the past twenty-three years, however, the consumption has increased from a little over three-quarters of a ton per head of population in 1886, having doubled in 1900, and reached its highest point of 2.946 tons in 1907. The consumption in Canada, however, is still small when compared with that of the United States, where the production has reached a total of about 5 tons per capita.

### Consumption of Coal in Canada, 1908-9.

	1908.		1909.	
	Tons.	Tons.	Tons.	Tons.
Production, Table 3. ....	10,886,311	.....	10,501,475	.....
Exports of Canada, Table 4. ....	1,729,833	.....	1,588,099	.....
Home consumption of Canadian coal. ....	.....	9,156,478	.....	8,913,376
Imports, Table 6. ....	10,297,495	.....	9,872,924	.....
Exports not produce of Canada, Table 4. ....	102,071	.....	161,098	.....
Canadian consumption of imported coal. ....	.....	10,195,424	.....	9,711,826
Total consumption of coal in Canada. ....	.....	19,351,902	.....	18,625,202

### COAL.—TABLE 7.

### Consumption of Coal in Canada, 1886-1909.

Calendar Year.	Canadian.	Imported.	Total.	Percentage Canadian.	Percentage Imported.	Consumption per capita
	Tons.	Tons.	Tons.			Tons.
1886. ....	1,595,950	1,884,161	3,480,111	45.9	54.1	0.758
1887. ....	1,848,365	2,192,260	4,040,625	45.7	54.3	0.871
1888. ....	2,013,925	3,314,353	5,328,278	37.8	62.2	1.137
1889. ....	1,992,988	2,490,931	4,483,919	44.4	55.6	0.946
1890. ....	2,360,196	2,581,187	4,941,383	47.8	52.2	1.031
1891. ....	2,606,490	2,980,222	5,586,712	46.7	53.3	1.153
1892. ....	2,464,012	3,082,429	5,546,441	44.4	55.6	1.133
1893. ....	2,823,187	3,110,462	5,933,649	47.6	52.4	1.198
1894. ....	2,743,376	2,917,818	5,661,194	48.5	51.5	1.130
1895. ....	2,467,109	2,933,752	5,400,861	45.7	54.3	1.066
1896. ....	2,639,055	3,206,456	5,845,511	45.1	54.9	1.140
1897. ....	2,799,977	3,124,485	5,924,462	47.3	52.7	1.143
1898. ....	3,023,079	3,274,981	6,298,060	48.0	52.0	1.200
1899. ....	3,631,882	4,092,361	7,724,243	47.0	53.0	1.454
1900. ....	3,989,542	4,361,563	8,351,105	47.8	52.2	1.561
1901. ....	4,912,664	4,810,213	9,722,877	50.5	49.5	1.810
1902. ....	5,376,413	5,165,938	10,542,351	51.0	49.0	1.927
1903. ....	6,005,735	5,491,870	11,507,605	52.2	47.8	2.055
1904. ....	6,697,183	6,909,651	13,606,834	49.2	50.8	2.346
1905. ....	7,032,661	7,343,880	14,376,541	48.9	51.1	2.396
1906. ....	7,927,560	7,398,906	15,326,466	51.7	48.3	2.425
1907. ....	8,617,352	10,549,503	19,166,855	45.0	55.0	2.946
1908. ....	9,156,478	10,195,424	19,351,902	47.3	52.7	2.826
1909. ....	8,913,376	9,711,826	18,625,202	47.9	52.1	2.599

### Nova Scotia.

The production of coal in Nova Scotia in 1909 was less than the 1908 production by 1,000,450 tons, or a decrease of 15 per cent. Yearly statistics of output, sales, colliery consumption and production since 1872 are shown in Table 8, the figures being given in both long and short tons. The production by counties during the past four years is shown in Table 9. The Provincial Department of Mines in this Province collects and publishes coal statistics covering the fiscal year ending September. The colliery output during the last three such years is shown in Table 10, and the distribution of coal sold during the same period, in Table 11.

The total production during the calendar year 1909 was 5,652,089 tons (5,046,508 long tons), of which 4,045,657 tons, or 72 per cent, were obtained from Cape Breton county, 734,042 tons, or 13 per cent, from Pictou, and 494,398 tons, or 9 per cent, from Cumberland county, the balance being from Inverness and Colchester counties.

The falling off in production in 1909 is probably to be attributed to a number of reasons, among which the labour strikes figure prominently. During the first five months of the year the demand for coal was apparently very much less than during the corresponding period in 1908. A large number of employes of the Dominion Coal Company went on strike in July, and although the collieries were not completely shut down the output was seriously reduced. A similar strike at the Inverness mine of the Inverness Railway and Coal Company affected that Company's output. The mines of the Cumberland Railway and Coal Company were almost completely closed by a strike on August 10.

The Marsh mine, in Pictou county, operated by the Nova Scotia Steel and Coal Company, was closed down at the end of March.

COAL.—TABLE 8.

## Nova Scotia: Output, Sales, Colliery Consumption, and Production.

Calendar Year.	Output, Tons, 2,240 lbs.	Sold or used, Tons, 2,240 lbs.	Colliery Consump- tion, Tons, 2,240 lbs.	Production,* Tons, 2,240 lbs.	Output, Tons, 2,000 lbs.	Sold or used, Tons, 2,000 lbs.	Colliery Consump- tion, Tons, 2,000 lbs.	Production,* Tons, 2,000 lbs.	Price per Ton, 2,240 lbs.	Value of Production. \$
1872.....	880,950	735,914	110,341	896,255	986,564	880,224	123,582	1,003,806	\$ 1 75	1,568,446
1873.....	1,051,467	881,106	108,398	989,504	1,177,043	986,839	121,406	1,108,215	1 75	1,731,632
1874.....	872,720	749,127	119,582	868,709	977,446	839,022	133,932	972,954	1 75	1,520,240
1875.....	781,165	706,795	124,110	830,905	874,905	791,610	139,068	930,613	1 75	1,454,084
1876.....	709,646	634,207	113,788	747,995	794,804	710,312	127,443	837,755	1 75	1,308,991
1877.....	757,496	687,065	98,841	785,906	848,396	769,513	110,702	880,215	1 75	1,375,339
1878.....	770,603	693,511	88,627	782,138	863,075	776,732	99,262	875,994	1 75	1,368,741
1879.....	788,271	688,624	84,787	773,411	882,563	771,259	94,961	866,220	1 75	1,353,469
1880.....	1,032,710	954,659	96,831	1,051,490	1,156,635	1,069,218	108,451	1,177,659	1 75	1,840,108
1881.....	1,124,270	1,035,014	107,888	1,142,902	1,259,183	1,156,216	120,834	1,280,050	1 75	2,000,079
1882.....	1,365,811	1,250,179	111,381	1,361,560	1,529,708	1,400,200	124,747	1,524,947	1 75	2,382,730
1883.....	1,422,553	1,297,523	111,949	1,409,472	1,538,259	1,453,226	125,383	1,578,609	1 75	2,466,576
1884.....	1,389,295	1,261,650	116,769	1,378,419	1,556,011	1,413,048	136,781	1,543,829	1 75	2,412,233
1885.....	1,352,205	1,234,510	127,624	1,382,134	1,514,470	1,405,051	142,939	1,547,990	1 75	2,418,735
1886.....	1,602,611	1,373,666	142,421	1,516,087	1,682,924	1,538,506	159,512	1,698,018	1 75	2,633,152
1887.....	1,670,830	1,519,684	139,777	1,659,461	1,871,330	1,702,046	156,550	1,858,596	1 75	2,904,057
1888.....	1,756,129	1,576,692	157,443	1,734,135	1,989,263	1,765,895	176,336	1,942,231	1 75	3,034,735
1889.....	1,755,219	1,555,107	158,131	1,713,238	1,987,932	1,741,720	177,107	1,918,827	1 75	2,998,167
1890.....	1,984,001	1,786,111	161,240	1,947,351	2,222,081	2,000,444	186,589	2,181,033	1 75	3,407,864
1891.....	2,044,784	1,848,945	174,383	2,024,928	2,290,158	2,071,938	195,981	2,267,919	1 75	3,543,624
1892.....	1,942,780	1,752,934	175,092	1,928,026	2,175,913	1,963,286	196,108	2,159,389	1 75	3,374,046
1893.....	2,223,042	1,977,543	205,425	2,182,968	2,489,807	2,214,848	280,076	2,444,924	1 75	3,820,194
1894.....	2,250,631	2,060,920	196,206	2,257,126	2,520,707	2,308,231	219,751	2,527,982	1 75	3,949,970
1895.....	1,999,756	1,793,098	193,639	1,986,737	2,239,727	2,008,270	216,875	2,225,145	1 75	3,476,790
1896.....	2,292,675	2,046,828	192,975	2,239,808	2,567,796	2,292,447	216,132	2,508,579	1 75	3,919,655
1897.....	2,340,031	2,044,672	181,716	2,226,358	2,620,835	2,230,032	203,522	2,493,554	1 75	3,896,179
1898.....	2,262,656	2,121,126	167,428	2,288,554	2,534,175	2,375,661	187,519	2,563,180	1 75	4,004,970
1899.....	2,865,443	2,633,989	177,460	2,811,449	3,209,299	2,950,067	198,755	3,148,822	2 00	5,622,898
1900.....	3,298,791	2,998,737	236,563	3,235,300	3,694,046	3,358,585	204,951	3,628,536	2 50	8,088,250
1901.....	3,821,033	3,411,127	301,434	3,712,561	4,273,557	3,820,462	337,606	4,158,068	1 75	6,496,982

(Table continued on page 14).

\* This production is obtained by adding sales and colliery consumption.

For sales previous to 1872, see report of the Department of Mines, Nova Scotia, 1883, page 51.



Nova Scotia: Output, Sales, Colliery Consumption, and Production.

Calendar Year.	Output, Tons, 2,240 lbs.	Sold or used, Tons, 2,240 lbs.	Colliery Consump- tion, Tons, 2,240 lbs.	Production,* Tons, 2,240 lbs.	Output, Tons, 2,000 lbs.	Sold or used, Tons, 2,000 lbs.	Colliery Consump- tion, Tons, 2,000 lbs.	Production,* Tons, 2,000 lbs.	Price per Ton, 2,240 lbs.	Value of Production.
1902.....	4,725,480	4,220,120	379,198	4,608,318	5,292,538	4,736,614	424,702	5,161,316	2 00	9,216,636
1903..	5,215,562	4,565,720	481,903	5,047,623	5,841,429	5,113,607	539,731	5,653,338	2 00	10,095,246
1904.....	5,131,985	4,561,740	144,904	4,996,644	5,747,823	5,097,949	498,292	5,596,241	2 00	9,993,288
1905.....	5,197,877	4,613,818	427,774	5,041,592	5,821,622	5,167,476	479,107	5,646,583	2 00	10,083,184
1906.....	5,844,813	5,093,131	460,891	5,554,022	6,546,191	5,704,307	516,198	6,220,505	2 00	11,108,044
1907.....	5,775,503	5,238,077	437,256	5,673,333	6,468,563	5,864,406	489,727	6,354,133	2 25	12,764,999
1908.....	6,076,330	5,224,787	576,509	5,939,767	6,806,489	5,851,761	645,690	5,652,539	2 25	13,364,476
1909.....	5,106,135	4,524,029	522,479	5,046,508	5,718,871	5,066,912	585,177	5,652,089	2 25	11,354,643

\* This production is obtained by adding sales and colliery consumption. For sales previous to 1872, see report of the Department of Mines, Nova Scotia, 1883, page 51.



COAL.—TABLE 9.

Nova Scotia: Coal trade by Counties, Calendar Years 1906-7-8-9.

Calendar Year.	Cumberland.		Pictou.		Cape Breton.		Other Counties.		Total.	
	Raised.	Sales.*	Raised.	Sales.*	Raised.	Sales.*	Raised.	Sales.*	Raised.	Sales.*
1906.	659,734	566,308	769,496	657,310	4,804,407	4,221,293	312,554	259,396	6,546,191	5,704,307
1907.	534,047	445,288	840,533	729,043	4,698,147	4,346,180	395,836	343,895	6,468,563	5,864,406
1908.	662,157	530,648	849,802	678,025	4,840,653	4,267,346	452,877	375,742	6,805,489	5,851,761
1909.	494,919	403,371	743,860	599,743	4,081,333	3,723,135	398,759	340,663	5,718,871	5,066,912

\* Includes coal used for making coke.

COAL.—TABLE 10.

Nova Scotia: Output by Collieries during Fiscal Years ending September 30, 1908-9.

Colliery.	Tons of 2,000 lbs.	Tons of 2,000 lbs.
<i>Cape Breton County.</i>	1908.	1909.
Dominion Coal Company.....	4,274,993	3,119,556
Nova Scotia Steel and Coal Co.....	741,832	848,444
North Atlantic Collieries.....	65,830	81,292
McKay Mining Company.....	15,187	15,217
Sydney Coal Company.....	5,377	5,301
Colonial Mining Co.....		709
<i>Cumberland County.</i>		
Cumberland Railway and Coal Co.....	466,068	421,437
Maritime Coal, Railway, and Power Co., Chignecto.....	17,740	56,392
" " " " Joggins.....	57,266	55,620
Minudie Coal Co.....	54,205	55,766
Strathcona Coal Co.....	26,799	7,936
Great Northern Coal Co.....	3,053	4,272
Atlantic Grindstone and Coal Co.....	964	721
Eastern Coal Co.....		4,940
<i>Colchester County.</i>		
Colchester Coal Co.....	4,425	1,490
<i>Pictou County.</i>		
Acadia Coal Co.....	463,436	408,792
International Coal Co.....	353,461	327,576
Marsh Colliery.....	53,586	22,585
<i>Inverness County.</i>		
Inverness Coal and Railway Company.....	317,748	296,546
Mabou Coal Co.....	21,560	1,804
Port Hood Coal Co.....	111,664	107,669

COAL.—TABLE 11.

## Nova Scotia: Distribution of Coal Sold.

Markets.	FISCAL YEARS ENDING SEPTEMBER 30.					
	1907.		1908.		1909.	
	Tons of 2,000 lbs.	%	Tons of 2,000 lbs.	%	Tons of 2,000 lbs.	%
Nova Scotia—						
Transported by land.....	1,740,736	30·80	1,804,377	29·37	1,642,716	31·77
"    " sea.....	322,773	5·71	380,332	6·19	359,462	6·57
Total, Nova Scotia.....	2,063,509	36·51	2,184,709	35·56	1,982,178	38·34
New Brunswick.....	478,383	8·46	571,570	9·30	607,968	11·76
Prince Edward Island.....	86,792	1·54	70,931	1·15	88,365	1·71
Quebec Province.....	1,914,743	33·88	2,293,352	37·33	1,689,876	32·69
Newfoundland.....	164,082	2·90	231,909	3·77	174,998	3·39
United States.....	690,269	12·21	559,592	9·11	359,224	6·95
West Indies.....	2,910	0·05				
Mexico.....	8,502	0·15				
St. Pierre.....			9,976	0·16	11,463	0·22
Bunker coal.....	229,121	4·05	216,554	3·53	254,681	4·92
Other countries.....	13,931	0·25	5,261	0·09	846	0·02
Totals.....	5,652,292	100·00	6,143,854	100·00	5,169,599	100·00

## New Brunswick.

The coal production of New Brunswick is derived from the Grand Lake coal field, in Queens county, where a comparatively large number of small mines—probably thirty or forty—are intermittently operated. It is very difficult to obtain accurate figures of production from this Province, but according to a reliable estimate made by the provincial authorities, the production in 1909 would be about 49,029 short tons, valued at \$98,496; this is a decrease as compared with 1908.

COAL.—TABLE 12.

## New Brunswick: Production.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
		\$	\$ cts.			\$	\$ cts.
1887.....	10,040	23,607	2 35	1899.....	10,528	15,792	1 50
1888.....	5,730	11,050	1 93	1900.....	10,000	15,000	1 50
1889.....	5,673	11,733	2 07	1901.....	17,630	51,857	2 94
1890.....	7,110	13,850	1 95	1902.....	18,795	39,680	2 11
1891.....	5,422	11,030	2 03	1903.....	16,000	40,000	2 50
1892.....	6,768	9,375	1 39	1904.....	9,112	18,224	2 00
1893.....	6,200	9,837	1 59	1905.....	29,400	58,800	2 00
1894.....	6,469	10,264	1 59	1906.....	34,076	68,152	2 00
1895.....	9,500	14,250	1 50	1907.....	34,584	77,814	2 25
1896.....	7,500	11,250	1 50	1908.....	60,000	135,000	2 25
1897.....	6,000	9,000	1 50	1909.....	49,029	98,496	2 25
1898.....	6,160	9,240	1 50				

### Saskatchewan.

The coal production in Saskatchewan shows a considerable increase in 1909 over that of the previous year, the total being 192,125 tons, valued at \$296,339. Production was reported by about twenty-one mines, of which four reported a production of 5,000 tons or over. There is probably a considerable tonnage of coal mined by farmers of which no record is obtained.

The output is obtained entirely from the Estevan or Souris fields, in the southern portion of the Province, and is used mainly for domestic purposes in Saskatchewan and Manitoba.

Statistics of production since 1890 are given in Table 13.

COAL.—TABLE 13.

### Saskatchewan: Annual Production.

Calendar Year.	Tons.	Value.	Average value per ton.	
			\$	cts.
1890 .....	200	200	1	00
1891 .....	5,400	9,325	1	73
1892 .....	8,325	12,485	1	50
1893 .....	15,051	15,153	1	01
1894 .....	15,769	31,538	2	00
1895 .....	16,706	25,059	1	50
1896 .....	25,000	37,500	1	50
1897 .....	25,000	37,500	1	50
1898 .....	25,000	37,500	1	50
1899 .....	40,500	60,750	1	50
1900 .....	45,000	72,000	1	60
1901 .....	70,400	112,640	1	52
1902 .....	116,703	169,618	1	45
1903 .....	124,885	187,021	1	50
1904 .....	107,596	152,334	1	42
1905 .....	108,398	164,146	1	51
1906 .....	151,232	252,437	1	67
1907 .....	150,556	253,790	1	69
1908 .....	192,125	296,339	1	54
1909 .....				

† Including a small quantity from the Turtle Mountain district, Manitoba.

A new lignite field was found in this Province in 1909, in the Lac LaRonge district, about 120 miles north of Prince Albert, by Wm. McInnes, of the Geological Survey. The deposit is described in the Summary Report of the Geological Survey, as follows:—

‘In the white quartz sands and sandstones, exposed in cliffs on the south shore of Wapawekka lake, a bed of lignite occurs, varying in thickness from 4’-6” (with a sandy 6 inch parting in the middle) to 2’-5” of fairly clean lignite. The seam lies about horizontal, and was traced in a longitudinal direction for a distance of 3½ miles, following the windings of the shore, thinning out westerly, or being represented by very dirty lignite or highly carbonaceous beds of sand; and not traceable farther easterly, owing to the higher encroachment of talus on the scarped face of the cliffs.

'A proximate analysis, by fast coking, of a sample of this lignite, made by F. G. Wait, of the Mines Branch, Department of Mines, gave the following results:—

Moisture.....	11.23
Volatile combustible matter.....	30.97
Fixed carbon.....	34.86
Ash.....	23.00
	<hr/>
	100.00

Coke, non-coherent—57.80.

Fuel ratio—1:1.13.

Colour of ash, light orange.

Split volatile ratio—1.88.

'From this analysis, it will be noted that, were it not for the rather high ash percentage—which is probably owing to included sand—this might be classed as a fairly lignitic coal.

'The seam is at its best at the extreme southwesterly point of the bay, where it attains both its greatest thickness and greatest purity. Northeastward and northwestward along the shore, it deteriorates both in size and purity; hence there is a reasonable probability that in the country farther south, back from the lake, where it is not exposed, the seam may be better.'

### Alberta.

The production of marketable coal in this Province in 1909, according to direct returns received from the operators, was 1,994,741 tons, valued at \$4,838,109, an increase of 309,080 tons, or 18 per cent over the 1908 production. The output has increased very rapidly, having doubled in the past five years, and being now over six times the production of ten years ago. Of the total production in 1909, only about 5.7 per cent, or 114,101 tons, were sold for export. The quantity used for making coke was 143,854 tons, or 7.2 per cent of the total. The railways use a very large portion of the coal production in this Province, having taken in 1909 upwards of 750,000 tons, or about 45.7 per cent of the total sold in Canada.

In view of the extensive railway construction in progress and the continued rapid influx of settlers, it is evident that the demand for coal will continue to increase at a rapid rate for a number of years, necessitating the extension of present colliery facilities as well as the opening up of new mines.

Statistics of production since 1887 are given in Table 14:—

COAL.—TABLE 14.

Alberta: Annual Production.

Calendar Year.	Tons.	Value.	Average value per ton.
		\$	\$ cts.
1887	74,152	157,577	2 13
1888	115,124	183,354	1 59
1889	97,364	179,640	1 85
1890	128,753	198,298	1 54
1891	174,131	437,243	2 51
1892	178,970	460,605	2 57
1893	230,070	586,260	2 55
1894	184,940	473,827	2 56
1895	169,885	382,526	2 25
1896	209,162	581,832	2 78
1897	242,163	630,408	2 60
1898	315,088	788,720	2 50
1899	309,600	774,000	2 50
1900	311,450	778,625	2 50
1901	340,275	850,687	2 50
1902	402,819	960,601	2 38
1903	495,893	1,117,541	2 25
1904	661,732	1,404,524	2 12
1905	931,917	1,993,915	2 14
1906	1,246,360	2,614,762	2 10
1907	1,591,579	3,836,286	2 41
1908	1,685,661	4,127,311	2 45
1909	1,994,741	4,838,109	2 43

These statistics cover the production of a small quantity of anthracite, as well as bituminous and lignite coal. The only operating anthracite mine at present is the Bankhead mine at Banff. The anthracite is very carefully prepared and sized for the market, and in its preparation much dust is produced; a part of this dust is manufactured into briquettes, which find a ready market for domestic use.

The following statistics showing the classification of the output of coal in Alberta during 1909, are quoted from the Report of the Provincial Inspector of Mines for 1909. The figures represent the total coal output, including non-merchantable coal, and are somewhat higher than those given in Table 14, which represent shipments only.

'Classification of output of coal in Alberta during the year 1909:—

	Tons.
Lignite coal. . . . .	763,673
Bituminous coal. . . . .	1,197,399
Anthracite coal. . . . .	213,257
Coal used in coke production. . . . .	148,104
Coke produced. . . . .	87,812
Briquettes produced. . . . .	89,785



## Summary of Statistics.

Number of mines at present in operation.. . . .	121
Number of new mines opened in 1909.. . . .	32
Number of mines abandoned in 1909.. . . .	8
Number of tons of coal mined.. . . .	2,174,329
Number of tons of coke produced.. . . .	87,812
Number of tons of briquettes produced.. . . .	89,785
Average number of persons employed inside the mine	3,893
Average number of persons employed outside the mines	1,314
Number of fatal accidents inside the mines.. . . .	7
Number of fatal accidents outside the mines.. . . .	2
Number of non-fatal accidents inside the mines..	47
Number of non-fatal accidents outside the mines..	13
Number of mine managers certificates issued.. . . .	27
Number of pit boss certificates issued.. . . .	23
Number of fire boss certificates issued.. . . .	44

Throughout the various coal mining districts of the Province, there has been during the year a considerable amount of development work and opening up of new mines, etc., of which the following summary is published by the Provincial Inspector of Mines:—

‘At Taber a number of the small companies have consolidated, and three larger and more substantial companies formed, viz., The Great Western Coal Company, The Alberta Consolidated Coal Company, Limited, and The Rock Springs Sootless Coal Company, Limited. All three of these Companies have installed good sized plants, including complete compressed air plants and coal mining machines, and two of them have already procured railway facilities.

‘In the Lethbridge district, the Diamond Coal Company, Limited, have completed the installation of their plant, put in a spur line of railway, and are now in a position to push the development of their mine ahead, which will put them in a position to produce a much larger output during the coming year. The Royal Collieries, Limited, are pushing the development of their mine ahead rapidly, and are getting it into shape for a much larger output. The new plant of the Alberta Railway and Irrigation Company, at their No. 6 mine, has been completed, and the development of the mine is being carried out on a large scale.

‘In the Crowsnest pass, the Leitch Collieries, Limited, have opened a new mine, erected a tippie, and obtained railway connexions. At Burmis, there is another mine opened by the Davenport Coal Company, who have procured railway connexions. At Blairmore, a new mine has been opened by The West Canadian Collieries, Limited, which should develop into a large mine. West of Coleman, the McGillivray Creek Coal and Coke Company, Limited, a new company which has been formed, has opened a mine on a 12 ft. seam of coal, and a new tippie and plant are in course of erection.

‘In the Pincher Creek district, the Western Coal and Coke Company; Limi-  
11797—12

ted, have had a gang of about thirty men prospecting the coal seams on their property during the last few months, and are now opening permanent tunnels.

'West of Edmonton, along the Grand Trunk Pacific railway, a number of companies which have recently been organized, have secured extensive properties, and have done considerable work in proving the coal seams. At least two of these companies have ordered machinery and are making preparations to develop their mines, and I understand will have railway connexions during 1910, which will place them in a position to produce a fair amount of coal by the end of the year.'

More complete details may be obtained from the report of the Provincial Inspector of Mines<sup>1</sup>.

Amongst the developments of particular interest are those that have taken place on the new coal finds in the foothills of the Rocky mountains, on the Big-horn basin, Brazeau river, Pembina river, etc., to the south of the Grand Trunk Pacific railway. These fields have been under investigation by Mr. D. B. Dowling, of the Geological Survey, a preliminary report on which will be found in the Summary Report of the Geological Survey for 1909. Mr. Dowling summarized his conclusions as follows:—

'South of the Grand Trunk Pacific Railway line, in the foothills, there are coal fields of large extent. Of these, the nearest to the railway is situated in the outer portion of the disturbed foothills area. From it domestic, and a fair grade of steam coal may be obtained. The area is situated on the headwaters of Embarras and Pembina rivers, and may be of larger extent than outlined on the accompanying sketch map. Over a portion of this area a seam of from 12 to 17 feet can be mined.

'Higher grade steam and coking coals may be obtained from more distant fields, to which approach is more difficult, since they are situated behind high, rocky ridges. The areas containing the best grade of coal extend in narrow strips from the Saskatchewan river to near the Athabaska, behind the Brazeau, Bighorn, and Nikanassin ranges, respectively. The parts which seem minable, and easy of approach through gaps in these ridges may be outlined as: the Brazeau Range area, on the Saskatchewan; the Bighorn basin, from the Saskatchewan to the Brazeau rivers; and the southern part of the Nikanassin basin, drained by the McLeod and North branch of the Brazeau rivers. These areas may not be minable outside a strip which is not much over a mile in width, but they have a total length of nearly eighty miles. A section of the measures near the Saskatchewan shows nearly 100 feet of workable coal, in about nine seams. Northward, the seams possibly decrease in thickness and number, but on the McLeod the upper part of the coal-bearing horizon was observed to have about 20 feet of coal seams. This may be added to by further prospecting.

'The character of the coal is remarkably uniform; and in almost all parts of the field, coking coals that yield 75 per cent of coke may be found. The Fiddle Creek portion, at the northern end of the Nikanassin basin, has not been examined, but it is reported that coal has been found at points within half a

<sup>1</sup>Annual Report of the Department of Public Works of the Province of Alberta, 1909.

mile of the Athabaska. Possibly there are anthracitic coals in this part of the basin, but the location of minable areas is considered to be of more importance than the finding of harder coals.'

The general character of the coal is thus summarized:—

'The coal of the Kootanie measures in the Bighorn basin has been carefully examined by several prospectors, and analyses have been published in the Summary Reports for 1907 and 1908, which show that it is a bituminous, or steam coal, with a high carbon content, not generally high in ash, and always low in sulphur. Practical tests with a small coke oven on Bighorn river show that a very high grade of coke can be made. Northward, in places, the fixed carbon content is higher, but it seldom approaches that of an anthracite coal.

'The coal of the Edmonton measures in the foothills on Pembina and Embarras rivers is of lower carbon content, and approaches what might be termed a low carbon bituminous coal. Its coke is not as firm as that from the coal fields nearer the mountain. This might be expected, as the measures are younger and have not been subjected to great pressure.'

#### 'DISTRIBUTION.

'In the Kootanie measures the coal seams found near the Saskatchewan are well distributed throughout the formation. There appears to be in nine seams a total thickness of 90 feet of workable coal. On George creek, one of the forks of the south branch of Brazeau river, Mr. McEvoy found ten seams, with 65 feet of workable coal. Near the north end of the range on Wapiabi creek, Mr. Malloch last year discovered four seams near the top of the formation, with about 26 feet of coal. On the north branch of the Brazeau, four seams are exposed in the same part of the measures, and on McLeod river the coal is apparently all in the upper measures.

'In the upper part of the Cretaceous, as exposed in the foothills on the Embarras and Little Pembina rivers, the coal seams occur in the Edmonton formation—the horizon in which the Big coal seam on the Saskatchewan, and that at the railway crossing on the Pembina occur.'

#### **British Columbia.**

A larger output of coal was derived from British Columbia mines in 1909 than in any previous year. The total production was 2,606,127 short tons (2,326,899 long tons), of which about 31.9 per cent was sold for export, the balance being used for home consumption and in the making of coke, of which a portion is also exported. The increase in production over that of 1908 was 272,419 short tons, or about 11.7 per cent. The total increase of production in ten years has been about 89.1 per cent. The quantity sold for export in 1909 is about the same as ten years ago, while the coal consumption of the Province has increased in the same time about 200 per cent. Of the total production in 1909, about 1,927,602 tons, or 74 per cent, were sold as coal, including coal sold for home consumption and for export; 439,290 tons, or 17 per cent, were used in making coke, and 239,235 tons, or 9 per cent, used for colliery consumption and by workmen.



The collieries of the Crows Nest Pass Coal Company in East Kootenay, and the Western Fuel Company and the Wellington Colliery Company on Vancouver island, contributed about 80 per cent of the total production.

The balance was mined from some seven smaller collieries, that are referred to by the Provincial Mineralogist in his Annual Report, as follows:—

‘In the Coast district, among the newer collieries that are beginning to make an appreciable output may be mentioned the Nicola Valley Coal and Coke Company, which shipped in 1909 some 62,210 tons of coal, and this production was limited by the market which the Canadian Pacific Railway freight rates would allow it to reach, rather than by the capacity of the mines. Adjoining this colliery is the Diamond Vale Colliery Company’s property, which, though still in a state of development, mined in 1909 some 1,700 tons of coal.

‘Vermilion Forks Mining and Development Company, of Princeton, mined 150 tons of coal in 1909.

‘On Vancouver island, the Pacific Coast Coal Mines, Limited, mined at South Wellington, a few miles south of Nanaimo, some 69,055 tons of coal. Railway and bunkers have been built at Boat harbour.

‘Gilfillan colliery shut down; Henry Biggs, as an individual, produced 1,236 tons of coal from the property.

‘In the East Kootenay field, the Hosmer and Corbin collieries each produced about 60,000 tons of coal during the year; neither of these collieries is as yet in full operation.

In the following table the production during the past two years is given, the sales in Canada and sales for export being given, as well as the quantity used for making coke and that used for colliery consumption. A distinction is also made between the production from the Coast mines and that in the East Kootenay and Nicola Valley districts.

Coal.	1908.			1909.		
	Coast.	Crowsnest and Nicola Valley.	Total.	Coast.	Crowsnest and Nicola Valley.	Total.
		Long tons.			Long tons.	
Sold for consumption in Canada	703,931	227,998	931,929	781,177	198,229	979,406
"    export to United States	300,445	266,829	567,274	324,728	353,430	678,158
"    "    other countries	29,883	.....	29,883	63,509	.....	63,509
	1,034,259	494,827	1,529,086	1,169,414	551,659	1,721,073
Used for making coke.....	25,172	354,460	379,632	26,760	365,463	392,223
"    colliery consumption...	49,975	124,975	174,950	70,625	142,978	213,603
Production.. ..	1,109,406	974,262	2,083,668	1,266,799	1,060,100	2,326,999

In Table 15 the statistics of coal production in British Columbia since 1836 are given. The total production to the end of 1909 has been 36,776,164 tons, of which 20,455,415 tons, or 55.6 per cent, have been produced during the past ten years. The average annual production during this period was 2,045,541 tons, as

compared with an average annual production of 1,081,764 tons during the ten year period 1890-1899.

COAL.—TABLE 15.

## British Columbia: Production.

Calendar Year.	Output, Tons, 2,240 lbs.	Home Consumption, Tons, 2,240 lbs.	Sold for Export, Tons, 2,240 lbs. †	PRODUCTION.*		Price per ton, 2,240 lbs.	Value.
				Tons, 2,240 lbs.	Tons, 2,240 lbs.		
1836-52...	10,000	From 1836 to 1873, inclusive, the output is taken as production.			11,200	4 00	40,000
1852-59...	25,398				28,446	4 00	101,592
1859 §.....	1,989				2,228	4 00	7,956
1860.....	14,247				15,957	4 00	56,988
1861.....	13,774				15,427	4 00	55,046
1862.....	18,118				20,292	4 00	72,472
1863.....	21,345				23,906	4 00	85,380
1864.....	28,632				32,068	4 00	114,528
1865.....	32,819				36,757	4 00	131,276
1866.....	25,115				28,129	4 00	100,460
1867.....	31,239				34,988	4 00	124,956
1868.....	44,005				49,286	4 00	176,020
1869.....	35,802				40,098	4 00	143,208
1870.....	29,843				33,424	4 00	119,372
1871-2-3...	148,459				166,274	4 00	593,836
1874.....	81,547	25,023	56,038	81,061	90,788	3 00	243,183
1875.....	110,145	31,252	66,392	97,644	109,361	3 00	292,932
1876.....	139,192	17,856	122,329	140,185	157,007	3 00	420,555
1877.....	154,052	24,311	115,381	139,692	156,455	3 00	419,076
1878.....	170,846	26,166	164,682	190,848	213,750	3 00	572,544
1879.....	241,301	40,294	192,096	232,390	260,277	3 00	697,170
1880.....	267,595	46,513	225,849	272,362	305,045	3 00	817,086
1881.....	228,357	40,191	189,323	229,514	257,056	3 00	698,542
1882.....	282,139	56,161	232,411	288,572	323,201	3 00	865,716
1883.....	213,299	64,786	149,567	214,353	240,075	3 00	643,059
1884.....	394,070	87,388	306,478	393,866	441,130	3 00	1,181,598
1885.....	365,596	95,227	237,797	333,024	372,987	3 00	999,072
1886.....	326,636	85,987	249,205	335,192	375,415	3 00	1,005,576
1887.....	413,360	99,216	334,839	434,055	486,142	3 00	1,302,165
1888.....	489,301	115,953	365,714	481,667	539,467	3 00	1,445,001
1889.....	579,830	124,574	443,675	568,249	636,439	3 00	1,704,747
1890.....	678,140	177,075	508,270	685,345	767,586	3 00	2,056,035
1891.....	1,029,097	202,697	806,479	1,009,176	1,130,277	3 00	3,027,528
1892.....	826,335	196,223	640,579	836,802	937,218	3 00	2,510,406
1893.....	978,294	207,851	768,917	976,768	1,093,980	3 00	2,930,304
1894.....	1,012,953	165,776	827,642	993,418	1,112,628	3 00	2,980,254
1895.....	939,654	183,349	756,334	914,683	1,058,045	3 00	2,834,049
1896.....	894,882	261,984	634,238	896,222	1,003,769	3 00	2,688,666
1897.....	802,296	290,310	619,860	910,170	1,019,390	3 00	2,730,510
1898.....	1,136,485	375,423	752,863	1,128,286	1,263,680	3 00	3,384,858
1899.....	1,306,324	526,058	751,711	1,277,769	1,431,101	3 00	3,833,307
1900.....	1,590,178	685,667	914,184	1,599,851	1,791,833	3 00	4,799,553
1901.....	1,691,557	799,666	914,163	1,713,829	1,919,488	3 00	5,141,487
1902.....	1,641,626	837,871	776,809	1,614,680	1,808,441	3 00	4,844,040
1903.....	1,450,662	947,499	549,449	1,496,948	1,676,581	3 00	4,490,844
1904.....	1,685,698	1,129,465	533,593	1,663,058	1,862,625	3 00	4,989,174
1905.....	1,736,696	1,089,667	647,343	1,737,010	1,945,452	3 00	5,211,030
1906.....	1,899,076	1,236,476	679,829	1,916,305	2,146,262	3 00	5,748,915
1907.....	2,219,602	1,438,402	673,114	2,111,516	2,364,898	3 50	7,390,306
1908.....	2,111,931	1,486,511	597,157	2,083,668	2,333,708	3 50	7,292,858
1909.....	2,388,196	1,585,232	741,667	2,326,899	2,606,127	3 50	8,144,147

\* This production is obtained by adding 'Home Consumption' and 'Sold for Export'.

† 52,935 tons of this amount were exported as sales without the division into 'Home Consumption' and 'Sold for Export'.

‡ The figures in the 'Sold for Export' column do not agree as they should with those given in Table 5, the only explanation being that the data in the two cases are from different sources, and it has not been possible to find out the cause of the difference.

§ Two months only.



The coal fields of British Columbia, more particularly those of the Rocky Mountain district, have been very completely described by Mr. W. F. Robertson in his last annual report.<sup>1</sup>

The developed collieries include those of the Crows Nest Pass Coal Company in operation since 1898, the Hosmer Mines, Limited, and the Corbin Coal and Coke Company, each active producers since 1908. Statistics of the production of these several collieries are published as in the following tables:—

**Production of Crows Nest Pass Coal Company—Gross Annual Output of Coal in tons of 2,240 pounds.**

Year.	Coal Creek.	Carbonado.	Michel.	Total.
1898	9,954			9,954
1899	102,610			102,610
1900	196,837		9,966	206,803
1901	322,245			322,245
1902	238,776	41,332	113,853	393,961
1903	215,791	138,750	235,347	589,888
1904	345,901	81,528	235,256	662,685
1905	425,493	96,934	309,505	831,932
1906	426,793	20,159	273,497	720,449
1907	522,783	220	353,728	876,731
1908	441,003	23,279	412,185	876,467
1909	379,968	32,287	390,462	802,717
	3,628,154	434,489	2,333,799	6,396,442

**Gross Annual Output of Coke, in tons of 2,240 pounds.**

Year.	Coal Creek.	Carbonado.	Michel.	Total.
1898	361			361
1899	29,658			29,658
1900	65,915			65,915
1901	111,683			111,683
1902	78,490		29,347	107,837
1903	84,321	695	64,818	149,764
1904	118,551	4,621	95,685	218,857
1905	123,593	7,826	124,705	256,124
1906	93,171		96,214	189,385
1907	88,775		117,766	206,541
1908	102,322		131,776	234,098
1909	117,268		106,174	223,442
	1,014,108	13,072	766,485	1,793,665

<sup>1</sup> Annual Report of the Minister of Mines, British Columbia, 1909.

**Production of Hosmer Colliery and Corbin Colliery—Gross Output of Coal and Coke, in tons of 2,240 pounds.**

Year.	Hosmer Colliery.		Corbin Colliery.	
	Coal.	Coke.	Coal.	Coke.
1908 .....	2,627	771	4,111	.....
1909 .....	60,324	21,575	60,824	.....

Complete statistics of the production of each colliery, with one exception, have been published by the British Columbia Bureau of Mines, from which the following statement has been compiled:—

**Coal Production by Collieries in British Columbia in 1909, in tons of 2,240 pounds.**

Operator.	Name of Mine.	Sales.	Used in making Coke.	Used under Colliery boilers, etc.	Total Sales and Used.	Output.
The Western Fuel Co.....	{ Protection .....	316,010	.....	29,819	345,829	340,367
	{ Northfield.....	125,162	.....	28,353	153,515	152,320
Wellington Collieries Co., Ltd.	Extension, Union.....	.....	.....	*	*	*
Pacific Coast Coal Mines, Ltd..	{ Fiddick.....	52,447	.....	3,860	56,307	67,045
	{ Suquash .....	540	.....	420	960	2,010
The Vancouver-Nanaimo Coal Mg. Co., Ltd.....	New East Wellington	8,636	.....	500	9,136	9,336
Nicola Valley Coal and Coke Co., Ltd.....	Middlesboro.....	61,546	.....	545	62,091	62,210
Vermilion Forks Mg. and Dev. Co., Ltd.....	Princeton.....	120	.....	20	**140	150
	{ Coal Creek .....	178,678	172,944	28,511	380,133	379,968
Crows Nest Pass Coal Co., Ltd.	{ Michel.....	207,815	157,245	25,546	390,606	390,462
	{ Carbonado.....	31,467	.....	1,301	32,768	32,287
Hosmer Mines, Ltd.....	Hosmer.....	11,643	35,275	12,180	59,098	60,324
Corbin Coal and Coke Co., Ltd	Corbin.....	60,192	.....	632	60,824	60,824
Diamond Vale Colliery Co.....	Diamond Vale.....	.....	.....	.....	.....	1,700

\* Permission for publication refused.

\*\* This Company began operations in December.

**Yukon.**

The coal production of the Yukon in 1909 is reported as 7,364 tons, valued at the mine at \$49,502. Active mining operations were carried on only by the Tantalus Coal Company, at Tantalus, in the southern Yukon, and by the Northern Light, Power, and Coal Company, Limited, operating on Coal creek, forty miles northwest of Dawson. Run of mine coal sold in Dawson at about \$10 a ton, and screened coal, \$18.

Statistics of production since 1901 are shown in Table 16 following:—

COAL.—TABLE 16.

**Yukon Territory: Annual Production.**

Calendar Year.	Tons.	Value.	Average value per ton.
		\$	\$ cts.
1901 .....	†5,864	86,230	14 70
1902 .....	4,910	37,280	7 59
1903 .....	1,849	29,584	16 00
1904 .....			
1905 .....	7,000	21,000	3 00
1906 .....	7,000	28,000	4 00
1907 .....	15,000	60,000	4 00
1908 .....	3,847	21,158	5 50
1909 .....	7,864	49,502	6 72

† Part of this production was mined in 1900.

The Whitehorse and Five Fingers coal mines in southern Yukon were not operated in 1909. The coal fields of this district at Whitehorse, Five Fingers, and Tantalus have been described by Mr. D. D. Cairnes, of the Geological Survey.<sup>1</sup>

During the season of 1909, Mr. Cairnes found coal outcroppings in the Wheaton River district, south of the Whitehorse deposits, his description of the area being as follows:—

‘BUSH MOUNTAIN COAL AREA.

‘The Tantalus conglomerates which, in the southern Yukon, are known to be coal-bearing, were found outcropping about one mile west of the Union mines, on the ridge joining Bush mountain and Idaho hill, and search was made for coal, which, if found in this locality, would be of considerable value. Three seams were discovered: one over 6 feet, one 18 inches, and one of unknown thickness, but at least 3 feet. There were indications of other seams; but as the ground was frozen and the coal deeply covered, to have made a section of the measures, or even to have determined the thickness of the different beds of coal, would have entailed a very considerable amount of work. The measures were traced from the summit of the ridge to near the valley bottoms of Schnabel and Follé creeks, on the south and north sides respectively. These creeks are here two miles apart, and, opposite the coal, are about 2,000 feet lower than the summit of the ridge between them. The belt of coal-bearing formation is about half a mile wide, and the rocks comprising it are much folded and disturbed. The coal, which is bituminous and of the same age as that at Whitehorse and Tantalus, should make a good fuel.’

<sup>1</sup> Report on a portion of the Conrad and Whitehorse Mining District, Yukon, D. D. Cairnes, Geological Survey, 1908.

## LABOUR AND ACCIDENTS.

This Department does not receive direct reports of mine accidents, and the labour statistics received are incomplete. The following tables, therefore, relating to labour and accidents in Canadian collieries are compiled from the published reports of Provincial mining bureaus.

The total number of persons engaged in coal mining, including the employes both above and below ground, may be taken as approximating very closely to 24,000, of whom about one-half are employed in Nova Scotia and New Brunswick, and the others in the western provinces.

The total number of accidents reported from Nova Scotia, Alberta, and British Columbia in 1909 was 344, of which 100 proved fatal and 244 more or less serious.

In Nova Scotia there were 112 accidents during the fiscal year ending September, of which 34 proved fatal. One-half of the fatal accidents were caused by falls of coal or rock, as were also 48 of the non-fatal accidents. No accidents were credited to gas explosions, and only three non-fatal to the use of explosives. In British Columbia, the total number of accidents was 163, of which 57 were fatal and 106 more or less serious. Thirteen fatal and 33 non-fatal accidents were due to falls of rock or coal. Thirty-two fatal and seven slight accidents were due to gas explosion. These thirty-two men lost their lives in the disastrous explosion that took place on October 5 at Extension colliery of the Wellington Colliery Company. Reports of special investigations into this disaster will be found in the British Columbia Bureau of Mines Report for 1909. Only one fatal and four non-fatal accidents were credited to the use of explosives in this Province.



# Number and Classes of Workmen employed at each mine in Nova Scotia, year ended September 30, 1909.

COMPANY.	UNDERGROUND.				SURFACE.				CONSTRUCTION.			TOTALS.		HORSES.		PIT DAYS.
	Skilled labour.	Labourers.	Boys.	Days.	Skilled labour.	Labourers.	Boys.	Days.	Skilled labour.	Labourers.	Boys.	Persons.	Days.	Above.	Below.	
Dominion Coal Co. ....	2,157	1,190	300	910,545	440	289	47	194,435	...	...	...	4,433	1,104,980	90	432	294
N. S. Steel & Coal Co. ....	952	650	185	463,941	136	162	23	96,897	...	...	...	2,108	569,838	13	473	275
" " Pictou .....	37	38	5	9,555	9	8	...	3,333	...	...	...	97	12,888	2	...	144
Cumberland Ry. & Coal Co. ....	578	469	138	238,578	150	293	35	88,839	...	...	...	1,663	347,417	18	76	237
Acadia Coal Co. ....	278	327	80	206,362	58	190	13	96,345	...	...	...	818	302,797	37	49	256
Intercolonial Coal Co. ....	302	221	72	160,903	65	125	27	64,804	3	...	230	818	225,937	11	35	294
Mar. Coal, Ry. & P. Co., Joggins .....	104	61	2	49,850	21	50	12	25,794	...	...	...	250	75,644	3	5	298
" " Chignecto. ....	82	45	13	35,712	11	35	2	12,215	...	...	...	193	47,927	2	6	289
Inverness Ry. & Coal Co. ....	350	148	25	139,836	44	60	12	31,562	...	...	...	629	171,398	6	25	261
Maibou & Gulf Coal Co. ....	15	13	...	1,371	13	4	...	1,341	...	...	...	45	2,712	...	...	78
Sydney Coal Co. ....	9	6	...	3,046	2	2	...	1,322	...	...	...	19	4,368	1	1	243
McKay Mining Co. ....	25	5	1	8,511	4	5	...	2,632	1	...	28	41	11,071	1	2	271
North Atlantic Collieries .....	86	54	16	37,468	13	44	6	15,351	3	11	...	233	55,940	8	20	237
Port Hood Coal Co. ....	100	89	9	49,755	28	33	3	16,758	...	...	...	262	66,513	6	8	250
Great Northern Coal Co. ....	13	3	1	2,804	6	1	...	1,592	1	...	180	25	4,576	2	...	300
Minudie Coal Co. ....	108	10	18	28,878	12	16	4	8,123	2	...	445	170	37,446	3	1	210
Strathcona Coal Co. ....	32	39	4	7,618	7	13	2	1,595	...	...	...	97	9,213	1	4	74
Atlantic Grindstone & Coal Co. ....	2	2	...	654	2	...	...	472	...	...	...	6	1,126	...	...	152
Colchester Coal Co. ....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Eastern Coal Co. ....	25	8	1	8,691	...	6	2	4,038	...	...	...	48	12,729	...	1	217
Colonial Coal Co. ....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	5,255	3,378	870	2,384,078	1,027	1,336	193	667,548	10	14	...	12,083	3,055,430	204	1,138	40

# Number of hands employed in coal mining in British Columbia in 1909.

	COAST COLLIERIES AND NICOLA VALLEY.		EAST KOOTENAY COLLIERIES.		Total.
	Under-ground.	Above-ground.	Under-ground.	Above-ground.	
Supervision and clerical assistance.	62	56	60	37	215
Whites, miners . . . . .	1,479	9	806	.....	2,294
Miners helpers . . . . .	551	.....	170	.....	721
Labourers . . . . .	551	96	202	370	1,219
Mechanics and skilled labourers.	114	224	476	268	1,082
Boys . . . . .	126	51	23	15	215
Japanese . . . . .	70	55	.....	.....	125
Chinese . . . . .	20	524	.....	.....	544
Indians . . . . .	3	.....	.....	.....	3
	2,976	1,015	1,737	690	6,418

## Accidents in Canadian Collieries, 1909.

Nature of Accident.	NOVA SCOTIA.*		ALBERTA.			BRITISH COLUMBIA.		
	Fatal.	Non-fatal.	Fatal.	Serious.	Slight.	Fatal.	Serious.	Slight.
Fall of coal, rock . . . . .	17	48	3	14	4	13	20	13
Gas or dust explosions . . . . .	.....	.....	.....	1	6	32	.....	7
Explosives . . . . .	.....	3	.....	1	3	1	1	3
Miscellaneous . . . . .	17	27	6	26	5	11	26	36
Total . . . . .	34	78	9	42	18	57	47	59
Total men employed . . . . .	12,083		5,207			6,418		

\* Twelve months ending Sept., 1909.

Table showing Accidents in British Columbia<sup>1</sup> Collieries in Ten Years, 1900-1909.

Year.	Men Em- ployed.	Coal Output.	Nature of Injury.	Explosion (cause un- known.)	Gas explosions.	Falls of coal.	Fall, rock.	Mine cars.	Mine timber.	Hoisting, ropes, etc.	Powder, etc., explo- sion.	Underground-Mis- cellaneous.	On surface-Mis- cellaneous.	Fire in Mine.	Total.	Grand Total.
1900	4,178	1,590,179	Fatal. ....	0	0	2	6	4	0	1	1	0	3	0	17	98
			Serious. ....	0	2	14	15	7	1	0	3	0	1	0	43	
			Slight. ....	0	22	3	3	3	1	0	0	0	0	0	38	
1901	3,974	1,691,557	Fatal. ....	64	2	6	6	3	0	0	0	0	2	19	102	167
			Serious. ....	0	2	9	8	5	2	2	4	0	2	0	34	
			Slight. ....	0	12	2	4	5	0	0	6	0	2	0	31	
1902	4,011	1,641,626	Fatal. ....	125	1	1	7	3	2	0	0	0	0	0	139	178
			Serious. ....	0	0	4	6	6	0	2	0	0	3	0	21	
			Slight. ....	0	8	1	2	5	0	0	1	0	1	0	18	
1903	4,264	1,481,913	Fatal. ....	0	21	4	8	5	1	0	1	0	2	0	42	101
			Serious. ....	0	0	5	8	7	2	4	7	0	0	0	33	
			Slight. ....	0	16	2	4	2	0	1	0	0	1	0	26	
1904	4,453	1,685,698	Fatal. ....	14	7	5	4	3	0	0	1	0	3	0	37	94
			Serious. ....	0	0	12	7	15	2	2	0	0	3	0	41	
			Slight. ....	0	8	1	1	5	0	0	1	0	0	0	16	
1905	4,407	1,825,832	Fatal. ....	0	0	2	4	3	1	0	1	0	1	0	12	68
			Serious. ....	0	0	8	6	9	2	0	1	2	2	0	30	
			Slight. ....	0	9	3	1	8	0	1	3	1	0	0	26	
1906	4,805	1,899,076	Fatal. ....	0	0	5	7	2	0	0	0	0	1	0	15	83
			Serious. ....	0	0	6	8	13	1	2	1	2	3	0	36	
			Slight. ....	0	1	3	7	13	1	1	1	3	2	0	32	
1907	6,059	2,219,608	Fatal. ....	0	1	8	2	8	0	0	1	1	10	0	31	154
			Serious. ....	0	1	15	7	22	4	0	2	1	9	0	61	
			Slight. ....	0	18	7	8	15	1	3	4	4	2	0	62	
1908	6,095	2,109,387	Fatal. ....	0	1	3	5	1	1	1	0	4	2	0	18	120
			Serious. ....	0	0	6	10	19	3	4	2	2	4	0	50	
			Slight. ....	0	8	10	7	15	0	0	4	5	3	0	52	
1909	6,418	2,400,600	Fatal. ....	0	32	7	6	6	0	0	1	2	3	0	57	163
			Serious. ....	0	0	7	13	17	2	0	1	2	5	0	47	
			Slight. ....	0	7	4	9	24	3	3	3	2	4	0	59	
1900-9	48,674	18,545,476	Fatal. ....	203	65	43	55	38	5	2	6	7	27	19	470	1,226
			Serious. ....	0	5	86	88	120	19	16	21	9	32	0	396	
			Slight. ....	0	109	36	46	95	6	9	39	15	15	0	360	

<sup>1</sup> British Columbia Minister of Mines Report 1909.

## COKE.

The total output of oven coke in 1909 was 871,727 tons, produced from 1,327,150 tons of coal; as compared with an output of 852,296 tons in 1908, produced from 1,315,904 tons of coal. The quantity of coke sold or used by the producer in 1909 was 862,011 tons, as compared with 858,257 tons in the previous year.

The production is derived almost entirely from domestic coal in the three Provinces of Nova Scotia, Alberta, and British Columbia, although during 1909 a quantity of imported coal was used by the Dominion Iron and Steel Company at Sydney, C.B.

The consumption of coke in Canada is much in excess of the domestic production, there being a considerable importation of coke, chiefly into Ontario and Quebec, for use in the metallurgical industries.

The imports during the calendar year 1909 were 661,425 tons, and the exports 74,067 tons. These figures, taken in conjunction with the production of 862,011, would indicate a consumption of about 1,449,369 tons. Similarly estimated, the consumption in 1908 was 1,285,228 tons.

With one or two exceptions, of which the Dominion Iron and Steel Company is the chief, the coke is produced by coal mining companies, and in ovens situated in proximity to the mines.

Statistics of coke production during the past three years are given in the following tables, in which is shown for each province, the quantity of coal used, the coke made, the quantity sold or used, and the stocks on hand, etc.

**Coke Production, 1907.**

Province.	Coal charged to Ovens.	Output of Coke.	STOCK ON HAND.		Coke sold or used.	Value of Sales, etc.
			Jan. 1.	Dec. 31.		
	Tons.	Tons.	Tons.	Tons.	Tons.	\$
Nova Scotia. ....	832,916	529,851	845	6,586	524,110	1,991,047
Alberta. ....	112,887	73,782	3,686	1,147	76,321	297,595
British Columbia. . .	398,864	249,663	1,745	9,836	241,572	1,294,826
Totals. ....	1,344,667	853,296	6,276	17,569	842,003	3,583,468

**Coke Production, 1908.**

Nova Scotia. ....	754,478	499,551	6,586	208	505,929	1,658,151
Alberta. ....	128,398	75,657	588	600	75,645	309,019
British Columbia. . .	433,028	277,088	9,836	10,241	276,683	1,482,191
Totals. ....	1,315,904	852,296	17,010	11,049	858,257	3,449,361

**Coke Production, 1909.**

Nova Scotia. . . . .	756,719	493,184	209	401	492,992	1,608,092
Alberta. ....	131,142	87,812	750	1,329	87,233	366,734
British Columbia. . .	439,289	290,731	10,170	19,115	281,786	1,509,567
Totals. ....	1,327,150	871,727	11,129	20,845	862,011	3,484,393



Table 1 shows the annual production since 1886, and Table 2 the production by provinces since 1897.

COKE.—TABLE 1.  
Annual Production, 1886-1909.

Calendar Year.	Tons.	Value.	Value per ton.
		\$	\$ cts.
1886.....	35,396	101,940	2 88
1887.....	40,428	135,951	3 36
1888.....	45,373	134,181	2 96
1889.....	54,539	155,043	2 84
1890.....	56,450	166,298	2 95
1891.....	57,084	175,592	3 08
1892.....	56,135	160,249	2 85
1893.....	61,078	161,790	2 65
1894.....	58,044	148,551	2 56
1895.....	53,356	143,047	2 68
1896.....	49,619	110,257	2 22
1897.....	60,686	176,457	2 91
1898.....	87,600	286,000	3 26
1899.....	100,820	350,022	3 47
1900.....	157,134	649,140	4 13
1901.....	365,531	1,228,225	3 36
1902.....	502,043	1,519,185	3 03
1903.....	561,318	1,734,404	3 09
1904.....	554,083	2,032,048	3 66
1905.....	700,488	2,436,211	3 48
1906.....	782,055	2,863,503	3 66
1907.....	842,003	3,583,468	4 26
1908.....	858,257	3,449,361	4 02
1909.....	862,011	3,484,393	4 04

COKE.—TABLE 2.  
Production of Coke by Provinces, 1897-1909.

Calendar Year.	NOVA SCOTIA.		BRITISH COLUMBIA.		ALBERTA.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
1897.....	41,532	90,950	19,154	85,507		
1898.....	48,400	111,000	39,200	175,000		
1899.....	62,459	178,767	38,361	171,255		
1900.....	61,767	223,395	93,367	425,745		
1901.....	222,694	590,560	142,837	637,665		
1902.....	363,330	899,930	138,713	619,255		
1903.....	371,745	884,094	189,573	846,310		
1904.....	275,927	808,022	257,172	1,148,090	20,984	78,936
1905.....	386,366	1,054,712	269,256	1,202,035	44,866	179,464
1906.....	476,364	1,540,976	236,205	1,054,485	69,486	268,042
1907.....	524,110	1,688,070	241,572	1,049,432	76,321	297,595
1908.....	505,929	1,658,151	276,683	1,482,191	75,645	309,019
1909.....	492,992	1,608,092	281,786	1,509,567	87,233	366,734

Coke production in Nova Scotia has shown successive decreases during the past two years, the production in 1909 being only slightly higher than that in 1906; in the western provinces, on the other hand, an increased production is shown. The coke output of Nova Scotia is used almost entirely in connexion with the manufacture of iron, while that of Alberta and British Columbia is used chiefly by the copper and lead smelters, finding a market in the United States as well as in British Columbia.

The total number of ovens in active operation on December 31 was 1,645, while 972 were reported idle on the same date and 120 in course of construction. In Nova Scotia, the Dominion Iron and Steel Company at Sydney has 500 finished ovens and 120 in course of construction, all of the Otto Hoffman by-product type.

It is claimed that the new ovens will be much more efficient than the old, that whereas the 500 old ovens with 200 men produced 1,250 tons of coke per 24 hours, the 120 new ovens with 56 men will produce 720 tons in the same time. The by-products from these ovens include tar and ammonia. The ammonia gas is extracted from the oven gas and used in the manufacture of ammonium sulphate. The tar is sold to the Dominion Tar and Chemical Company, whose works are contiguous to the coke oven plant, and this product is further treated for the manufacture of refined tar, pitch of various grades, benzole, creosote, carbolic acid, etc. The production of tar in 1909 was 4,016,824 gallons, and ammonia liquor containing 3,351 tons of sulphate of ammonia. In 1908, the production of tar was 4,450,166 gallons, and of sulphate of ammonia, 2,984 tons.

The Nova Scotia Steel and Coal Company has 30 ovens of the Bauer type and 120 Bernard ovens; the latter are situated near the blast furnace, and the surplus gas used for the production of steam for the electric power plant. The surplus gas from the Bauer ovens is used in generating steam for general colliery use.

The other ovens in this Province number 181, and are all of the beehive type.

In Alberta, the West Canadian Collieries, Limited, at Lille, has 50 ovens of the Bernard type, or Belgian ovens. The ovens of the International Coal and Coke Company at Coleman, 216 in number, are the ordinary beehive, as are also all of the ovens in British Columbia, comprising 1,420 in the Crowsnest district and 100 on the Coast.

The distribution of the coke production during the past two years is shown in the following table:—

	1908.			1909.		
	Nova Scotia.	Alberta and British Columbia.	Total.	Nova Scotia.	Alberta and British Columbia.	Total.
Sold in Canada. . . . .	6,412	287,930	294,342	6,027	291,453	297,480
Sold for export. . . . .		64,398	64,398		77,407	77,407
Total sales. . . . .	6,412	352,328	358,740	6,027	368,860	374,887
Used by maker in blast furnace or otherwise. . . . .	499,517		499,517	486,965	159	487,124
Total sold or used . . . .	505,929	352,328	858,257	492,992	369,019	862,011

Statistics of exports and imports of coke, as published by the Customs Department, are shown in Tables 3 and 4 following. The exports are almost altogether from British Columbia, and recently from Alberta, and the imports are from the United States, chiefly for consumption in the iron and steel and smelting industries of Ontario and Quebec.

COKE.—TABLE 3.

Exports of Coke to the United States, 1897-1909.

Calendar Year.	Tons.	Value.
		\$
1897. . . . .	2,987	6,078
1898. . . . .	3,774	8,394
1899. . . . .	5,557	18,726
1900. . . . .	41,529	131,278
1901. . . . .	57,505	176,990
1902. . . . .	62,568	180,920
1903. . . . .	32,608	135,957
1904. . . . .	102,463	345,031
1905. . . . .	116,071	509,908
1906. . . . .	37,063	168,571
1907. . . . .	70,617	320,357
1908. . . . .	58,708	243,759
1909. . . . .	74,067	329,051

## COKE.—TABLE 4.

## Imports of Oven Coke, 1880-1909.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		\$			\$
1880.....	3,837	19,353	1895.....	43,235	149,434
1881.....	5,492	26,123	1896.....	61,612	203,826
1882.....	8,157	36,670	1897.....	83,330	267,540
1883.....	8,943	38,588	1898.....	135,060	347,040
1884.....	11,207	44,518	1899.....	141,284	362,826
1885.....	11,564	41,391	1900.....	187,878	506,839
1886.....	11,858	39,756	1901.....	308,786	680,138
1887.....	15,110	56,222	1902.....	267,142	842,815
1888.....	25,487	102,334	1903.....	256,723	1,222,756
1889.....	29,557	91,902	1904.....	221,050	766,123
1890.....	36,564	133,344	1905.....	371,593	807,842
1891.....	38,533	177,605	1906.....	480,222	1,311,375
1892.....	43,499	194,421	1907*.....	400,536	1,132,680
1893.....	41,821	156,277	1908.....	619,269	2,166,036
1894.....	42,864	176,996	1909†.....	466,292	1,136,624

\* For nine months only. † Duty free.

Coke is manufactured from coal mined in five of the coal basins in Canada, viz., the Sydney field, the Pictou field, both in Nova Scotia; the Frank-Blairmore field in southwestern Alberta; the Crowsnest field in East Kootenay, and the Comox field on Vancouver island, both of the latter in British Columbia.

The following table shows the proportionate yield in coke from the coals in the various fields charged into the ovens. These percentages of coke produced relatively to the coal charged have been compiled from the returns of the last five years:—

Year.	Sydney Field.	Pictou Field.	Frank-Blairmore Field.	Crowsnest Field.	Comox Field, Vancouver Island.
1905.....	62·90	50·22	65·14	64·33	49·61
1906.....	63·65	53·41	66·74	62·29	38·90
1907.....	64·22	54·81	65·36	63·97	49·10
1908.....	66·42	55·81	58·92	65·08	49·73
1909.....	65·24	59·17	66·96	67·67	58·26
Average.....	64·60	53·02	64·47	64·70	51·32

The average has been computed from the total coal charged during the five years, and the total coke output resulting.

In the Sydney field the ovens used are all by-product ovens, whereas the coal of the Pictou field is made into coke in beehive ovens. We may here mention that a certain amount of Springhill coal, Cumberland field, is mixed with this coal, which it has not been possible to separate to calculate the yield in coke.

In the Blairmore field both Belgian ovens and beehive ovens are used. On Vancouver island the coke is made in beehive ovens.

It may be interesting to point out that in this last field, only the fine screenings are used in the manufacture of coke. This coal is thoroughly washed before being charged into the ovens, and the refuse resulting from this treatment often amounts to 50 per cent. This refuse is rejected, and only the washed coal is charged into the ovens. The yield is computed from the quantity of washed coal.



## GRAPHITE.

The total shipments of refined graphite in 1909 were returned as 864 tons, valued at \$47,800, an average value per ton of \$55.32. No shipments of crude ore were reported. In 1908, the total shipments were 251½ tons valued at \$5,565, of which, 250 tons valued at \$5,400 were crude ore and 1½ tons valued at \$165 refined graphite. The 1907 shipments comprised 459 tons of ore valued at \$11,000, and 120 tons of refined product valued at \$5,000.

Statistics of the annual production since 1886 are shown in Table 1.

GRAPHITE.—TABLE 1.

### Annual Production.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	500	4,000	1898.....		13,698
1887.....	300	2,400	1899.....	1,130	24,179
1888.....	150	1,200	1900.....	1,922	31,040
1889.....	242	3,160	1901.....	2,210	38,780
1890.....	175	5,200	1902.....	1,095	28,300
1891.....	260	1,560	1903.....	728	23,745
1892.....	167	3,763	1904.....	452	11,760
1893.....	Nil.	Nil.	1905.....	541	16,735
1894*.....	3	223	1906.....	387	18,300
1895.....	220	6,150	1907.....	579	16,000
1896.....	139	9,455	1908.....	251½	5,565
1897.....	436	16,240	1909.....	864	47,800

\*Exports.

The graphite shipments in 1909 comprised 134 tons valued at \$10,176, from mills in the Buckingham district, Que., and 730 tons valued at \$37,624 from Ontario mills. The production in Quebec Province was mainly the result of development work and experimental mill work.

In Ontario, the Black Donald mine at Whitefish lake, 14 miles from Calabogie, was operated by the Black Donald Graphite Company, Limited. This Company refines all its product, which finds a market in the United States and Europe, as well as in Canada. The mill is operated throughout the year, and the mine for about three months. Power for the mine and mill is developed at the Madawaska river, 2 miles distant. Shipments are made from Calabogie station.

The Globe Refining Company, Limited, operated a mine and mill near Port Elmsley, Lanark county.

There appears to be a growing demand for graphite, and some inquiry has recently been received from England for supplies of this mineral.

The exports of graphite, according to customs returns, are shown in Table 2. These are classified as crude ore and concentrates, and manufactures. The ore and concentrates exported in 1909 are given as 1,004 tons, valued at \$52,438, and manufactures of graphite as \$864, or a total valuation of \$53,302. Of the ore and concentrates exported 83 tons, valued at \$9,035, were reported as shipped to Great Britain; 905 tons, valued at \$41,558, to the United States, and 16 tons, valued at \$1,845, to other countries.

GRAPHITE.—TABLE 2.

## Exports of Graphite.

Year.	CRUDE.		MANU- FACTURES.	Total Value.
	Tons.	Value.	Value.	
		\$	\$	\$
1886.....				3,586
1887.....				3,017
1888.....				1,080
1889.....				538
1890.....				1,529
1891.....				72
1892.....				3,952
1893.....	1	88	10	48
1894.....	3	223		223
1895.....	544	4,803	30	4,833
1896.....	136	9,126	354	9,480
1897.....	205	2,988	1,337	4,325
1898.....	591	11,527	1,571	13,098
1899.....	1,237	19,326	3,164	22,490
1900.....	1,550	40,132	6,065	46,197
1901.....	1,194	30,535	4,567	35,102
1902.....	886	23,097	1,742	24,839
1903.....	412	26,230	17,412	43,642
1904.....	177	9,609	6,958	16,567
1905.....	254	7,596	518	8,114
1906.....	106	2,468	5,274	7,742
1907.....	121	3,036	2,847	5,883
1908.....	385	10,158	876	11,034
1909.....	1,004	52,438	864	53,302

Statistics of imports of graphite into Canada, given in Table 3, show an importation principally of manufactured graphite products to a value of \$76,548 during the fiscal year 1909, and a valuation of \$83,592 during the previous fiscal year.

The imports of graphite during the calendar year 1909 were valued at \$94,392, and comprised, plumbago, not ground, \$5,075; black lead, \$11,638; plumbago, ground, and manufactures, \$37,538; and crucibles, clay, or plumbago, \$40,141.

## GRAPHITE.—TABLE 3.

## Imports of Raw and Manufactured Graphite.

Fiscal Year.	Plumbago not ground.	Black Lead.	Ground and Manufactures.	Crucibles, Clay or Plumbago.	Total.
	\$	\$	\$		\$
1880.....	1,677	18,055	2,738	.....	22,470
1881.....	2,479	26,544	1,202	.....	30,225
1882.....	1,028	25,132	2,181	.....	28,341
1883.....	3,147	21,151	2,141	.....	26,439
1884.....	2,891	24,002	2,152	.....	29,045
1885.....	3,729	24,487	2,805	.....	31,021
1886.....	5,522	23,211	1,408	.....	30,141
1887.....	4,020	25,766	2,830	.....	32,616
1888.....	3,802	7,824	22,604	.....	34,230
1889.....	3,546	11,852	21,789	.....	37,187
1890.....	3,441	10,276	26,605	.....	40,322
1891.....	7,217	8,292	26,201	.....	41,710
1892.....	2,988	13,560	23,085	.....	39,633
1893.....	3,293	16,595	23,051	.....	42,939
1894.....	2,177	17,614	15,196	1,490	36,477
1895.....	2,586	13,922	16,361	5,627	38,496
1896.....	2,865	18,434	12,090	7,407	40,796
1897.....	1,406	17,863	14,768	5,906	39,943
1898.....	1,862	19,638	20,120	12,533	54,153
1899.....	4,979	21,334	22,140	14,350	62,803
1900.....	4,437	22,078	17,869	20,571	64,955
1901.....	2,357	25,646	11,016	38,874	77,893
1902.....	3,649	20,467	15,021	28,635	67,772
1903.....	2,870	22,559	12,493	34,624	72,546
1904.....	1,802	26,053	12,737	28,773	69,365
1905.....	2,499	30,743	13,192	31,353	77,787
1906.....	2,791	33,907	19,058	32,950	88,706
1907 (9 mos.).....	3,176	16,646	13,740	27,271	60,833
1908.....	3,030	9,042	31,428	40,092	83,592
1909.....	1,408	11,009	26,918	37,213	76,548

The market for graphite in Great Britain is to some extent indicated by the imports into that country which are shown as follows:—

Imports of Plumbago into Great Britain, 1909.<sup>1</sup>

Country Whence Consigned.	Tons (short.)	Value.	Value per Ton.
		\$	\$
Germany.....	2,172	91,094	42
France.....	321	20,659	64
Italy.....	1,217	26,173	21½
Austria-Hungary.....	413	18,279	44
Japan.....	4,052	106,147	26
United States.....	326	32,042	98
Other foreign countries.....	704	29,862	42
British India.....	2,044	141,815	69
Ceylon and dependencies.....	7,237	690,434	95
Australia.....	71	16,790	236
Canada.....	71	7,957	112
Other British possessions.....	14	949	68
Total.....	18,642	1,182,201	63

British Trade Report, 1909.

Prices of refined graphite in London as quoted in the 'Mining Journal' of December 31, 1909, were as follows:—

PURIFIED, MILLED, AND GROUND

Ceylon, 97 to 99 per cent,	£59 to £63 per ton c.i.f., London.
" 90 to 91 "	40 to 42 " " "
" 80 to 81 "	30 to 32 " " "
" 70 to 71 "	27 to 28 " " "
American large flake,	45 to 49 " " "
" small "	35 to 45 " " "

ARTIFICIAL GRAPHITE.

The manufacture of artificial graphite in electric furnaces has been carried on for some years at Niagara Falls, New York, by the International Atcheson Graphite Company. A small plant has now been established on the Canadian side of the river at Niagara Falls, Ont., and the quantity of artificial graphite made during 1906 is reported by the manufacturers as 445,047 pounds.

In 1907 the quantity made was 407,779 pounds; in 1908, 428,540 pounds, and in 1909, 513,436 pounds.



## GYPSUM.

The total shipments of gypsum products in 1909, including crude, ground, and calcined gypsum, were 473,129 tons, valued at \$809,632; as compared with 340,964 tons, valued at \$575,701, in 1908, an increase of 38.8 per cent in quantity and of 40.6 per cent in total value.

The total quantity of crude gypsum mined in 1909 was 493,086 tons, as compared with 375,444 tons in 1908. The quantity calcined in 1909 was reported as 63,670 tons, as compared with 48,727 tons in 1908. The 1909 shipments included 423,474 tons of crude gypsum of an average value of \$1.08 per ton; 8,814 tons of ground gypsum, at an average value of \$2.97, and 40,841 tons of calcined product at an average value of \$7.99 per ton.

The total quantity of the gypsum mined, and the quantity calcined during the past five years are shown hereunder.

Year.	Total Gypsum mined.	Gypsum calcined.
	Tons.	Tons.
1905.....	443,569	26,855
1906.....	492,759	28,831
1907.....	489,962	34,752
1908.....	375,444	48,727
1909.....	493,086	63,670

A very large part of the gypsum mined is shipped in lump form as quarried to calcining mills in the United States. From 8,000 to 10,000 tons are ground for use as land plaster, etc., while the balance, about 12 per cent, is calcined in Canada for the manufacture of plaster of Paris, wall plaster, and other products. Crude gypsum is also used in the manufacture of Portland cement.

The chief centres of production are as usual in the Provinces of Nova Scotia and New Brunswick, the output from which finds a ready market, mainly in the New England States and principally as crude gypsum. The calcined product of these Provinces finds a market throughout Canada. Small quantities are mined in Ontario and Manitoba, the greater part of which is sold calcined.

The United States tariff on gypsum was reduced in August, 1909, that on crude gypsum from 50 cents a ton to 30 cents a ton, and on ground or calcined gypsum from \$2.25 per ton to \$1.75 per ton.

The present United States tariff on gypsum and gypsum products is defined in the following clause:—

‘Plaster rock or gypsum, crude, thirty cents per ton; if ground or calcined, one dollar and seventy-five cents per ton; pearl hardening for paper makers’ use, twenty per centum ad valorem; Keen’s cement or other cement of which gypsum

is the component material of chief value, if valued at ten dollars per ton or less, three dollars and fifty cents per ton; if valued above ten dollars and not above fifteen dollars per ton, five dollars per ton; if valued above fifteen dollars and not above thirty dollars per ton, ten dollars per ton; if valued above thirty dollars per ton, fourteen dollars per ton.'

It is expected that the reduced tariff will result in a largely increased production of gypsum from Nova Scotia and New Brunswick.

Detailed statistics of the production and sales during the past five years, of crude, crude ground, and calcined gypsum are shown in Table 1; while the total annual sales of gypsum products since 1886 are shown in Table 2, and the sales by Provinces in Table 3.

GYPSUM.—TABLE 1.

## Sales and Shipments of Crude, Ground, and Calcined Gypsum, 1905-1909.

	CRUDE (LUMP).			CRUDE GROUND.		
	Tons.	Value.	Per ton.	Tons.	Value.	Average per ton.
		\$	\$ cts.		\$	\$ cts.
1905.....	412,155	409,146	0 99	3,255	8,779	2 70
1906.....	442,132	473,960	1 07	3,195	9,823	3 07
1907.....	454,668	473,831	1 04	6,732	16,268	2 42
1908.....	298,188	307,532	1 03	9,504	25,468	2 68
1909.....	423,474	457,038	1 08	8,814	26,159	2 97

	CALCINED.			TOTAL SALES.		
	Tons.	Value.	Per ton.	Tons.	Value.	Average per ton.
		\$	\$ cts.		\$	\$ cts.
1905.....	26,748	168,243	6 29	442,158	586,168	1 32
1906.....	23,695	159,511	6 73	469,022	643,294	1 37
1907.....	24,521	156,815	6 40	485,921	646,914	1 33
1908.....	33,272	242,701	7 29	340,964	575,701	1 69
1909.....	40,841	326,435	7 99	473,129	809,632	1 71

GYPSUM.—TABLE 2.

## Annual Production of Gypsum Products.

Calendar Year.	Tons.	Value.	Average per ton.	Calendar Year.	Tons.	Value.	Average per ton.
		\$	\$ cts.			\$	\$ cts.
1886.....	162,000	178,742	1 10	1898.....	219,256	232,515	1 06
1887.....	154,008	157,277	1 02	1899.....	244,566	257,329	1 05
1888.....	175,887	179,393	1 01	1900.....	252,101	259,009	1 02
1889.....	213,273	205,108	0 96	1901.....	293,799	340,148	1 16
1890.....	226,509	194,033	0 86	1902.....	333,599	379,479	1 14
1891.....	203,605	206,251	1 01	1903.....	314,489	388,459	1 24
1892.....	241,048	241,127	1 00	1904.....	345,961	373,474	1 08
1893.....	192,568	196,150	1 02	1905.....	442,158	586,168	1 32
1894.....	223,631	202,031	0 90	1906.....	469,022	643,294	1 37
1895.....	226,178	202,608	0 89	1907.....	485,921	646,914	1 33
1896.....	207,032	178,061	0 86	1908.....	340,964	575,701	1 69
1897.....	239,691	244,531	1 02	1909.....	473,129	809,632	1 71

## GYPSUM.—TABLE 3.

## Annual Production by Provinces.

Calendar Year.	NOVA SCOTIA.		NEW BRUNSWICK.		ONTARIO.		MANITOBA.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$		\$
1887	116,346	116,346	29,102	29,216	8,560	11,715		
1888	124,818	120,429	44,369	48,764	6,700	10,200		
1889	165,025	142,850	40,866	49,130	7,382	13,128		
1890	181,285	154,972	39,024	30,986	6,200	8,075		
1891	161,934	153,955	36,011	33,996	5,660	13,300		
1892	197,019	170,021	39,709	65,707	4,320	5,399		
1893	152,754	144,111	36,916	41,846	2,898	10,193		
1894	168,300	147,644	52,962	48,200	2,369	6,187		
1895	156,809	133,929	66,949	63,839	2,420	4,840		
1896	136,590	111,251	67,137	59,024	3,305	7,786		
1897	155,572	121,754	82,658	118,116	1,461	4,661		
1898	132,086	106,610	86,083	121,704	1,087	4,201		
1899	126,754	102,055	116,792	151,296	1,020	3,978		
1900	138,712	108,828	112,294	145,850	1,095	4,331		
1901	170,100	136,947	121,595	189,709	1,504	5,692	600	7,800
1902	206,087	181,425	124,041	170,153	1,917	7,699	1,554	20,202
1903	189,427	173,881	119,182	172,080	2,720	21,988	3,160	20,510
1904	218,580	153,600	190,991	187,524	2,390	18,350	4,000	14,000
1905	272,252	298,248	163,553	232,586	1,853	23,834	4,500	31,500
1906	333,312	345,414	131,246	250,960	2,965	24,420	3,200	22,500
1907	357,411	380,859	118,106	213,638	10,404	52,417		
1908	234,455	230,433	81,620	191,312	10,389	42,456	14,500	111,500
1909	345,682	364,379	98,716	226,975	11,731	48,278	17,000	170,000

Statistics of exports and imports of gypsum, as compiled from the Reports of Trade and Navigation, are shown in Tables 4, 5, and 6. The annual exports of crude gypsum, which are almost altogether from the Maritime Provinces, are shown in Table 4.

There is a small export of ground gypsum, the annual value of which is shown in Table 5. The imports of gypsum shown in Table 6 have, until the past three or four years, been comparatively small; however, during these years there has been a considerable increase in the imports of crude gypsum and of plaster of Paris. The statistics given in Table 6 cover the fiscal year ending March, 1909. The imports during the calendar year 1909 include crude gypsum, 3,958 tons, valued at \$12,507; ground gypsum, 10,737 tons, valued at \$16,779, and plaster of Paris, 19,116 tons valued at \$112,429, or a total tonnage of 33,811 and a total value of \$141,715.

The imports of plaster of Paris previous to 1905 were comparatively small, ranging from only \$2,500 to \$8,000 in value annually; since that year, however, these imports have risen to an annual value of over \$112,000.

GYPSUM.—TABLE 4.  
Exports of Crude Gypsum.

Calendar Year.	NOVA SCOTIA.		NEW BRUNSWICK.		ONTARIO.		TOTAL.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$		\$
1874	67,830	68,164					67,830	68,164
1875	86,065	86,193	5,420	5,420			91,485	91,613
1876	87,720	87,590	4,925	6,616	120	180	92,765	94,386
1877	106,950	93,867	5,030	5,030			111,980	98,897
1878	88,631	76,695	16,335	16,435	489	675	105,455	93,805
1879	95,623	71,353	8,791	8,791	579	720	104,993	80,864
1880	125,685	111,833	10,375	10,987	875	1,240	136,935	124,060
1881	110,303	100,284	10,310	15,025	657	1,040	121,270	116,349
1882	133,426	121,070	15,597	24,581	1,249	1,946	150,272	147,597
1883	145,448	132,834	20,242	35,557	462	837	166,152	169,228
1884	107,653	100,446	21,800	32,751	688	1,254	130,141	134,451
1885	81,887	77,898	15,140	27,730	525	787	97,552	106,415
1886	118,985	114,116	23,498	40,559	350	538	142,833	155,218
1887	112,557	106,910	19,942	39,295	225	337	132,724	146,542
1888	124,818	120,429	20	50	670	910	125,508	121,389
1889	146,204	142,850	31,495	50,862	483	692	178,182	194,404
1890	145,452	139,707	30,034	52,291	205	256	175,691	192,254
1891	143,770	140,438	27,586	41,350	5	7	171,311	181,795
1892	162,372	157,463	27,488	43,623			189,860	201,086
1893	132,131	122,556	30,061	36,706			162,192	159,262
1894	119,569	111,586	40,843	46,538			160,412	158,124
1895	133,369	125,651	56,117	67,593			189,486	193,244
1896	116,331	109,054	64,946	77,535			181,277	186,589
1897	122,984	116,665	66,222	80,485			189,206	197,150
1898	99,215	93,474	70,399	81,433			169,614	174,907
1899	104,795	99,984	96,831	108,094	* $\frac{1}{2}$	12	201,626	208,090
1900							188,262	201,912
1901							236,247	231,594
1902							289,600	295,215
1903							287,496	311,586
1904							298,211	316,436
1905							359,246	388,474
1906							404,464	462,814
1907							375,026	424,794
1908							280,091	324,574
1909							315,201	372,286

\* Exported from British Columbia.

GYPSUM.—TABLE 5.  
Exports of Ground Gypsum.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1890	105	1897	6,763	1904	2,333
1891	588	1898	6,448	1905	2,673
1892	20,255	1899	8,123	1906	2,934
1893	22,132	1900	19,834	1907	557
1894	20,054	1901	15,337	1908	9,765
1895	22,233	1902	5,101	1909	2,787
1896	21,267	1903	12,457		



## GYPSUM.—TABLE 6.

## Imports of Gypsum, etc.

Fiscal Year.	CRUDE GYPSUM.		GROUND GYPSUM.		PLASTER OF PARIS.	
	Tons.	Value.	Lbs.	Value.	Lbs.	Value.
		\$		\$		\$
1880.....	1,854	3,203	1,606,578	5,948	667,676	2,376
1881.....	1,731	3,442	1,544,714	4,676	574,006	2,864
1882.....	2,132	3,761	759,460	2,576	751,147	4,184
1883.....	1,384	3,001	1,017,905	2,579	1,443,650	7,867
1884.....		3,416	687,432	1,936	782,920	5,226
1885.....	1,353	2,354	461,400	1,177	689,521	4,809
1886.....	1,870	2,429	224,119	675	820,273	5,463
1887.....	1,557	2,492	13,266	73	594,146	4,342
1888.....	1,236	2,193	106,068	558	942,338	6,662
1889.....	1,360	2,472	74,390	372	1,173,996	8,513
1890.....	1,050	1,928	434,400	2,136	693,435	6,004
1891.....	376	640	36,500	215	1,035,605	8,412
1892.....	626	1,182	310,250	2,149	1,166,200	5,595
1893.....	496	1,014	140,830	442	552,130	3,143
1894.....		1,660	23,270	198	422,700	2,386
1895.....	603	960	20,700	88	259,200	1,619
1896.....	1,045	848	64,500	198	297,000	2,000
1897.....		772	45,000	123	969,900	4,489
1898.....	1,147	1,742	35,700	293	329,600	2,025
1899.....	325	692	33,900	338	496,300	3,120
1900.....	77	958	6,300	69	849,100	6,492
1901.....	286	1,125	65,400	1,097	502,200	3,978
1902.....	541	1,697	56,700	249	475,300	2,641
1903.....	1,076	2,187	68,700	228	630,800	3,599
1904.....	249	663	106,800	559	625,100	2,885
1905.....	2,344	7,386	2,255,700	2,681	7,924,100	37,643
1906.....	6,332	22,008	1,968,600	1,799	12,866,500	43,742
1907 (9 mos.).....	9,189	23,410	609,600	1,619	19,849,400	58,364
1908.....	9,393	36,510	382,500	1,781	15,020,000	51,328
1909.....	10,317	35,268	6,286,200	5,765	17,009,000	64,849

Crude gypsum, duty free. Ground gypsum, duty 15 per cent. Plaster of Paris, duty 12½c. per 100 lbs.

In Nova Scotia the total quantity of crude gypsum mined in 1909 was 357,813 tons, as compared with 254,540 tons in 1908, and 351,611 tons in 1907. Of the total in 1909, about 85 per cent was mined from quarries in Hants county at Windsor, Walton, Cheverie, Noel, etc., the balance being quarried at St. Ann, Victoria county, and Cheticamp, Inverness county. In New Brunswick the principal operating quarries are located at Hillsborough, some production being also made from the Tobique River deposits in Victoria county. The total crude gypsum mined in the Province in 1909 was 99,539 tons, as against 90,015 tons in 1908.

In Ontario, 10,734 tons were reported as having been mined during 1909, and in Manitoba, 22,000 tons. The output in both these Provinces is practically all calcined.

Following is a list of active operators:—

Location of Quarry.	Name of Operator.	Address.
St. Ann, N.S.....	Victoria Gypsum Mining and Mfg. Co.	Quarry St. Ann, N.S.
Cheticamp, N.S.....	Great Northern Mining Co., Ltd....	Eastern Harbour, N.S.
Cheverie and Walton, N.S.....	Albert Parsons.....	Walton, N.S.
Newport Station, N.S.....	Windsor Gypsum Co.....	Windsor, N.S.
Eagle Swamp, N.S.....	Wentworth Gypsum Co., Ltd.....	"
Burtons, N.S.....	Windsor Plaster Co., Ltd.....	"
Threemile Plains, N.S.....	Nova Scotia Gypsum Co., Ltd.....	Threemile Plains, N.S.
Nappan, N.S.....	Maritime Gypsum Co., Ltd.....	New York, No. 1, Madison
Noel, N.S.....	Noel Plaster Co.....	Noel, N.S. [Ave.
Avondale, N.S.....	Newport Plaster Mining and Mfg. Co.	Windsor, N.S.
McKinnon Harbour, N.S.....	Newark Plaster Co.....	McKinnon Harbour, N.S.
Hillsborough, N.B.....	Hillsboro Plaster Co.....	Windsor, N.S.
Hillsborough, N.B.....	Albert Manufacturing Co.....	Hillsborough, N.B.
Tobique River, N.B.....	John E. Stewart.....	Andover, N.B.
Caledonia, Ont.....	Alabastine Co., Paris, Ltd.....	Paris, Ont.
Cayuga, Ont.....	Imperial Plaster Co., Ltd.....	Toronto, King St. West, Ont.
Gypsumville, Man.....	Manitoba Gypsum Co., Ltd.....	Winnipeg, Man.

## MANGANESE.

No return was received of any production or shipment of manganese during 1909, although three tons valued at \$434 are reported by the Customs Department as having been exported.

The manganese industry was at one time of considerable magnitude in the Provinces of Nova Scotia and New Brunswick, particularly during the decade between 1880 and 1890, the annual value of shipments ranging from \$30,000 to nearly \$50,000.

Statistics of annual production are shown in Table 1, and of exports in Table 2. The annual imports of oxide of manganese are shown in Table 3.

MANGANESE.—TABLE 1.

### Annual Production.

Calendar Year.	Tons.	Value.	Value. per ton.	Calendar Year.	Tons.	Value.	Value. per ton.
		\$	\$ cts.			\$	\$ cts.
1886.....	1,789	41,499	23 20	1898.....	50	1,600	32 00
1887.....	1,245	43,658	35 07	1899.....	1,581	20,004	12 65
1888.....	1,801	47,944	26 62	1900.....	30	1,800	60 00
1889.....	1,455	32,737	22 50	1901*.....	440	4,820	10 95
1890.....	1,328	32,550	24 51	1902*.....	172	4,062	23 62
1891.....	255	6,694	26 25	1903.....	91	2,775	30 49
1892.....	115	10,250	89 13	1904.....	66	2,740	41 51
1893.....	213	14,578	68 44	1905*.....	22	1,720	78 18
1894.....	74	4,180	56 49	1906*.....	93	925	9 95
1895.....	125	8,464	67 71	1907*.....	1	22	22 00
1896*.....	123½	3,975	32 19	1908.....			
1897*.....	15½	1,166	76 46	1909.....			

\* Exports.

MANGANESE.—TABLE 2.

### Exports of Manganese Ore.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1873.....	1,031	20,192	1892.....	143	8,205
1874.....	782	16,973	1893.....	133	12,521
1875.....	203	5,514	1894.....	56	3,120
1876.....	412	8,039	1895.....	108 3	6,351
1877.....	891	15,909	1896.....	123 5	3,975
1878.....	626	10,860	1897.....	15 3	1,166
1879.....	1,886	27,436	1898.....	11	325
1880.....	2,179	34,797	1899.....	70	2,410
1881.....	1,704	40,554	1900.....	34	1,720
1882.....	894	25,747	1901.....	440	4,820
1883.....	1,326	25,343	1902.....	172	4,062
1884.....	603	20,089	1903.....	135	1,889
1885.....	1,684	34,649	1904.....	123	2,706
1886.....	(a) 1,818	58,338	1905.....	22	1,720
1887.....	1,415	34,802	1906.....	93	925
1888.....	1,181	21,832	1907.....	1	22
1889.....	1,436	29,350	1908.....		
1890.....	1,906	36,831	1909.....	3	434
1891.....	255	6,694			

(a) 250 tons from Cornwallis should more correctly be classed under the heading of mineral pigments.

MANGANESE.—TABLE 3.  
Imports:—Oxide of Manganese.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1884.....	3,989	258	1897.....	70,663	2,741
1885.....	36,778	1,794	1898.....	130,456	5,047
1886.....	44,967	1,753	1899.....	141,356	5,539
1887.....	59,655	2,933	1900.....	126,725	4,155
1888.....	65,014	3,022	1901.....	272,134	8,176
1889.....	52,241	2,182	1902.....	476,331	5,360
1890.....	67,452	3,192	1903.....	279,611	8,051
1891.....	92,087	3,743	1904.....	275,696	7,051
1892.....	76,097	3,530	1905.....	235,289	6,832
1893.....	94,116	3,696	1906.....	244,620	5,508
1894.....	101,863	4,522	1907 (9 mos).....	386,404	11,087
1895.....	64,151	2,781	1908.....	732,242	17,863
1896.....	108,590	4,075	1909.....	382,137	6,561



## MICA.

The mining of mica in Canada is at present confined to the western part of the Province of Quebec and the eastern part of Ontario. In the former Province, deposits of mica are being worked in the region to the north of the City of Ottawa, in the townships of Buckingham, Templeton, Hull, and Wakefeld. In Ontario there are mica mines in the townships of North Burgess and South Sherbrooke, in Lanark county; South Burgess in the county of Leeds; in the townships of Bedford and Loughborough, in Frontenac county. Practically all the mica mined in Canada is of the amber variety and is used as insulating material in the manufacture of electrical apparatus. The principal foreign market of Canadian mica is the United States; an appreciable part of the production is consumed in Canada, and a proportion, which is increasing steadily, finds its way to Great Britain and other European markets, where it comes into competition with mica from India and other countries.

As has been remarked in previous reports, the annual statistics of production of mica which have been published in the past have been somewhat unsatisfactory, for numerous reasons. The value of the mica varies greatly according to the preparation which it has undergone, of which there are several stages not well defined between the rough cobbled condition at the mine, and the prepared and selected mica as it leaves the trimming factory, and the returns received are not always specific as to which value is adopted. There are, moreover, a great number of small operators, who work deposits intermittently according to the conditions of the mica market, and it is very difficult to obtain complete returns from these.

According to returns received from the operators, shipments of mica during the past two years were as follows:—

### Mica, Rough and Thumb-trimmed, Reported as Shipped during 1908 and 1909.

Province.	1908			1909		
	Tons.	Value.	Value per Ton.	Tons.	Value.	Value per Ton.
		\$	\$		\$	\$
Quebec .....	148	82,613	558 20	128	93,298	728 89
Ontario .....	288	57,258	198 81	241	54,484	226 07
Total .....	436	139,871	320 80	369	147,782	400 49

## Mica Reported as Shipped during 1907.

Province.	Tons.	Value.	Value per Ton.
		\$	\$ cts.
Quebec .....	318	224,197	705 02
Ontario .....	456	88,402	193 86
Total .....	774	312,599	403 86

The Ontario Bureau of Mines reports a larger production of mica than is shown in the above tables. According to this authority the production in Ontario in 1908 was 368 tons, valued at \$73,586, and in 1909, 350 tons, valued at \$73,124.

The market for mica has been rather dull during the past two years, and considerable stocks have been accumulated by some operators.

Table 1 following, shows the statistics of mica production since 1886.

MICA.—TABLE 1.  
Annual Production.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1886. ....	29,008	1894. ....	45,581	1902. ....	135,904
1887. ....	29,816	1895. ....	65,000	1903. ....	177,857
1888. ....	30,207	1896. ....	60,000	1904. ....	160,777
1889. ....	28,718	1897. ....	76,000	1905. ....	178,235
1890. ....	68,074	1898. ....	118,375	1906. ....	303,913
1891. ....	71,510	1899. ....	163,000	1907. ....	312,599
1892. ....	104,745	1900. ....	166,000	1908. ....	139,871
1893. ....	75,719	1901. ....	160,000	1909. ....	147,782

Table 2 following gives the exports of mica from Canada since 1887 as compiled from the reports of the Customs Department.

MICA.—TABLE 2.  
Exports.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Tons.	Value.
	\$		\$			\$
1887. ....	3,480	1894. ....	38,971	1902. ....		391,812
1888. ....	23,563	1895. ....	48,525	1903. ....		196,020
1889. ....	30,597	1896. ....	47,756	1904. ....		198,482
1890. ....	22,468	1897. ....	69,101	1905. ....		179,049
1891. ....	37,590	1898. ....	110,507	1906. ....	912	581,919
1892. ....	86,562	1899. ....	153,002	1907. ....	558	422,172
1893. ....	70,081	1900. ....	146,750	1908. ....	290	198,839
		1901. ....	152,553	1909. ....	359	256,834

The destination of exports during the calendar years 1908 and 1909 was as follows:—

	1908		1909	
	Tons.	Value.	Tons.	Value.
		\$		\$
To Great Britain.....	155	81,050	31	24,316
To United States.....	132	115,005	325	229,689
To other countries.....	3	2,784	3	2,829
Total .....	290	198,839	359	256,834

For the purpose of illustrating the relative importance of the imports of Canadian mica into the United States as compared with those from other countries which also supply part of the mica consumed in that country, the following table is given, while the market available in Great Britain is indicated by the statistics given in Table 4.

MICA.—TABLE 3.

Imports of Mica into the United States.<sup>1</sup>

Year ending June 30.	IMPORTS FROM CANADA.		TOTAL IMPORTS FROM ALL COUNTRIES.	
	Tons.	Value.	Tons.	Value.
		\$		\$
1895.....	273	39,637	410	127,515
1896.....	310	57,908	632	214,997
1897.....	208	54,630	441	187,845
1898.....	233	53,854	313	94,294
1899.....	512	131,310	808	259,228
1900.....	549	136,981	1,019	314,882
1901.....	484	161,741	1,011	369,644
1902.....	427	184,287	903	384,818
1903.....	417	196,470	973	414,953
1904.....	287	137,191	693	306,937
1905.....	253	121,560	594	296,362
1906.....	539	328,991	1,206	731,484
1907.....	767	506,321	1,724	1,295,606
1908.....	172	140,166	655	567,550
1909.....	167	132,941	403	313,525

<sup>1</sup> The Foreign Commerce and Navigation of the United States.

MICA.—TABLE 4.  
Imports of Mica into Great Britain.

	1908		1909	
	Pounds.	Value.	Pounds.	Value.
		\$		\$
Germany.....	73,136	14,581	75,264	13,349
German East Africa.....	17,920	2,287	68,320	15,009
United States.....	299,264	27,613	142,352	9,441
Brazil.....	23,296	3,728	4,032	793
Other foreign countries.....	56,112	11,476	22,848	4,804
British India.....	2,737,952	416,343	2,604,224	480,700
Canada.....	244,944	74,465	67,424	30,791
Other British possessions.....	24,416	3,777	2,352	886
Total.....	3,477,040	554,270	2,986,816	555,773

## MINERAL PIGMENTS.

Under this heading is included the production of ochres and barytes.

### Ochres.

The production of ochres in 1909 included 1,940 tons, valued at \$25,093 or an average of \$12.93 per ton, used for paint manufactures, and 2,000 tons valued at \$3,000 shipped to gas works throughout Canada, a total production of 3,940 tons valued at \$28,093. This is slightly less than the production during the previous three years.

The ochre used for the manufacture of paints is calcined and ground at the place of production, while that used for the purification of illuminating gas is shipped crude to gas companies.

Statistics of production since 1886 are shown in Table 1.

MINERAL PIGMENTS.—TABLE 1.  
Annual Production of Ochres and Iron Oxides.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	350	2,350	1898.....	2,226	17,450
1887.....	485	3,733	1899..	3,919	20,000
1888.....	397	7,900	1900.....	1,966	15,398
1889.....	794	15,280	1901.....	2,233	16,735
1890.....	275	5,125	1902.....	4,955	30,495
1891.....	900	17,750	1903.....	6,266	32,760
1892.....	390	5,800	1904.....	3,925	24,995
1893.....	1,070	17,710	1905.....	5,105	34,675
1894.....	611	8,690	1906.....	6,758	36,125
1895.....	1,339	14,600	1907.....	5,828	35,570
1896.....	2,362	16,045	1908.....	4,746	30,440
1897.....	3,905	23,560	1909.....	3,940	28,093

The working of ochre deposits is practically confined in Canada to one district, situated between Champlain and Three Rivers, in the Province of Quebec, a short distance back from the shore of the St. Lawrence river.

Numerous deposits of ochre are found in the Province of Quebec, but are not worked at present. In Ontario small quantities of ochre are occasionally mined from a deposit situated near Campbellville, but no production has been reported for two years past.

The following are the firms which are mining ochres in Canada:—

The Canada Paint Company, Montreal, Que.

The Champlain Oxide Company, Three Rivers, Que.

Thos. H. Argall, Three Rivers, Que.

Ontario Mineral Paint Company, Campbellville, Ont.



The following tables show the annual statistics of imports and exports of ochres:—

MINERAL PIGMENTS.—TABLE 2.

## Imports of Ochres.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	571,454	6,544	1895.....	793,258	12,048
1881.....	677,115	8,972	1896.....	1,159,494	16,954
1882.....	731,526	8,202	1897.....	1,504,044	18,504
1883.....	898,376	10,375	1898.....	2,126,592	26,307
1884.....	533,416	6,398	1899.....	2,444,698	31,092
1885.....	1,119,177	12,782	1900.....	2,474,537	32,017
1886.....	1,100,243	12,267	1901.....	2,092,067	27,267
1887.....	1,460,128	17,067	1902.....	2,530,743	33,909
1888.....	1,725,460	17,664	1903.....	3,215,346	42,243
1889.....	1,342,783	12,994	1904.....	2,767,580	36,636
1890.....	1,394,811	14,066	1905.....	3,122,690	35,887
1891.....	1,528,696	20,550	1906.....	4,321,530	57,397
1892.....	1,708,645	22,908	1907 (9 months)...	2,926,528	39,675
1893.....	1,968,645	23,134	1908.....	3,749,132	39,923
1894.....	1,358,326	18,951	1909.....	2,122,781	27,540

	Duty.	1908.		1909.	
		Lbs.	\$	Lbs.	\$
Ochres and ochrey earths and raw siennas.....	20 %	1,731,036	18,042	1,203,276	13,164
Oxides, dry fillers, fireproofs, umbers and burnt siennas N.E.S. ....	25 %	2,018,096	21,881	919,505	14,376
Total.....		3,749,132	39,923	2,122,781	27,540

MINERAL PIGMENTS.—TABLE 3.

## Exports of Mineral Pigments, Iron Oxides, etc.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1897.....	512	7,706	1904.....	416	7,260
1898.....	283	4,227	1905.....	353	7,704
1899.....	308	5,408	1906.....	139	2,379
1900.....	651	7,154	1907.....	191	10,043
1901.....	401	8,233	1908.....	125	4,850
1902.....	352	6,182	1909.....	658	7,956
1903.....	676	12,770			

## Barytes.

The only production of barytes reported for 1909 was 179 tons, valued at \$1,120, which was taken out in development work at Five Islands, Colchester county, Nova Scotia.

The mine of the Barium Reduction Company, at Lake Ainslie, Inverness county, was not in operation during the year, and the Company made an assignment in November, 1909.

At Five Islands, Messrs. Bayne and Soley Bros. continued the development of their property, and were engaged in the construction of roads, and preparing for the establishment of a mill and power plant. This firm proposes to turn out a finished product for the Canadian market.

Statistics of production since 1885 are shown in Table 4, and imports in Table 5. Statistics of imports of barytes have not been separately shown by the Customs Department since 1890, but the imports of blanc fixe (artificial sulphate of barium) and satin white, during the twelve months ending March, 1910, amounted to 629 tons valued at \$14,735.

MINERAL PIGMENTS.—TABLE 4.

## Annual Production of Barytes.

Calendar Year.	Tons.	Value.	Average Value.	Calendar Year.	Tons.	Value.	Average Value.
		\$	\$ cts.			\$	\$ cts.
1885.....	300	1,500	5 00	1898.....	1,125	5,533	4 92
1886.....	3,864	19,270	4 98	1899.....	720	4,402	6 11
1887.....	400	2,400	6 00	1900.....	1,337	7,605	5 69
1888.....	1,100	3,850	3 50	1901.....	653	3,842	5 89
1889.....				1902.....	1,096	3,957	3 61
1890.....	1,842	7,543	4 09	1903.....	1,163	3,931	3 38
1891.....				1904.....	1,382	3,702	2 68
1892.....	315	1,260	4 00	1905.....	3,360	7,500	2 23
1893.....				1906.....	4,000	12,000	3 00
1894.....	1,081	2,830	2 62	1907.....	1,344	3,000	2 23
1895.....				1908.....	4,312	19,021	4 41
1896.....	145	715	4 93	1909.....	179	1,120	6 26
1897.....	571	3,060	5 36				

MINERAL PIGMENTS.—TABLE 5.

## Imports of Barytes.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$
1880.....	2,230	1,525	1886.....		62
1881.....	3,740	1,011	1887.....	379	676
1882.....	497	303	1888.....	236	214
1883.....		185	1889.....	1,332	987
1884.....		229	1890.....	1,322	978
1885.....	7	14			

## Exports of Barytes.

Calendar Year.	Cwt.	Value.	Calendar Year.	Cwt.	Value.
		\$			\$
1901.....	208	3,820	1906.....	1,350	6,750
1902.....			1907.....	550	2,750
1903.....	406	368	1908.....	3,509	13,690
1904.....	13,080	5,178	1909.....		
1905.....	34,488	14,343			

## MINERAL WATER.

The statistics of production given herewith represent as closely as can be obtained the value of mineral water shipped from mineral springs in bottles, barrels, or other containers, and do not include any estimate for the value of mineral water used at the spring for drinking or bathing purposes, nor are the natural pure spring waters included, of which a considerable quantity is sold in bottled form.

The production in 1909 was valued at \$175,173, and represented over 450,000 gallons.

Statistics of production and imports are shown in tables following:—

MINERAL WATERS.—TABLE 1.

### Annual Production.

Calendar Year.	Gals.	Value.	Calendar Year.	Gals.	Value.	Calendar Year.	Gals.	Value.
		\$			\$			\$
1888.....	124,850	11,456	1896.....	706,372	111,736	1903.....		100,000
1889.....	424,600	37,360	1897.....	749,691	141,477	1904.....		100,000
1890.....	561,165	66,031	1898.....	555,000	100,000	1905.....		100,000
1891.....	427,485	54,268	1899.....		100,000	1906.....		100,000
1892.....	640,380	75,348	1900.....		75,000	1907.....		136,020
1893.....	725,096	108,347	1901.....		100,000	1908.....		151,953
1894.....	767,460	110,040	1902.....		100,000	1909.....		175,173
1895.....	739,382	126,048						

MINERAL WATERS.—TABLE 2.

### Imports.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	41,797	1890.....	71,521	1900.....	30,343
1881.....	55,763	1891.....	15,721	1901.....	40,802
1882.....	57,953	1892.....	17,913	1902.....	91,871
1883.....	49,546	1893.....	27,909	1903.....	108,130
1884.....	48,613	1894.....	28,130	1904.....	137,304
1885.....	55,864	1895.....	27,879	1905.....	161,790
1886.....	47,006	1896.....	32,674	1906.....	178,639
1887.....	52,989	1897.....	22,142	1907 (9 months)...	143,416
1888.....	54,891	1898.....	33,314	1908.....	153,831
1889.....	66,331	1899.....	38,046	1909.....	159,221

	1909.	
	Gals.	\$
Mineral waters, natural, not in bottle. Duty free.....	4,445	1,030
Mineral and aerated waters..... " 20 per cent.....		158,191
Total .....		159,221

## NATURAL GAS.

The total value of the production of natural gas in Canada in 1909 was, according to returns received, \$1,207,029, as compared with a value of \$1,012,660 in 1908. The quantity used in 1909 was somewhat in excess of 5,600,000 M cubic feet.

The value of the production in Ontario was returned as \$1,145,307, and in Alberta \$61,722.

There has been a very considerable increase in the production and use of natural gas during the past seven years, the value having risen from \$202,210 in 1903, to over five times that amount in 1909. Returns showed 660 producing wells in Ontario, of which 106 were completed during the year. In this Province, the three principal producing fields are known as the Welland county, Haldimand and Norfolk, and the Essex-Kent.

In Alberta, Medicine Hat is, as yet, the only place to use natural gas.

The annual value of the production of natural gas is shown in Table 1.

NATURAL GAS.—TABLE 1.

Annual Production since 1892.

Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$
1892 .....	150,000	1901 .....	339,476
1893 .....	376,233	1902 .....	195,992
1894 .....	313,754	1903 .....	202,210
1895 .....	423,032	1904 .....	328,376
1896 .....	276,301	1905 .....	379,561
1897 .....	325,873	1906 .....	583,523
1898 .....	322,123	1907 .....	815,032
1899 .....	387,271	1908 .....	1,012,660
1900 .....	417,094	1909 .....	1,207,029

Considerable quantities of gas were at one time exported to Detroit and Buffalo, adjacent respectively to the Essex and Welland fields, but this export has now ceased. Under the provisions of Chap. 16, 6-7 Edward VII, entitled 'An Act to regulate the exportation of electric power and certain liquids and gases,' assented to April 27, 1907, the export of natural gas is prohibited except under special license issued by the Governor in Council.

In order to consume the supply of natural gas and as far as possible prevent its waste, the Ontario Legislature in 1908 passed an 'Act to prevent the wasting of natural gas and to provide for the plugging of all abandoned wells' (7 Edward VII, Chapter 47), by which power was conferred upon inspectors appointed under the Act, to enforce the stoppage of waste. The Supplementary Revenue Act, 1907 (Ontario Statutes), also contained provisions which have



been even more effective than those of the first mentioned Act, and the enforcement of these laws has, according to the Bureau of Mines, reduced the waste of gas to a minimum.

In Alberta, while the commercial use of gas is confined to Medicine Hat and vicinity, the existence of natural gas in large quantities has been found over a wide area.

The Canadian Pacific railway, during the past few years, has been doing a great deal of drilling in search of oil and gas at various points in central Alberta, and has struck large flows of gas at Dunmore Junction, 4 miles east of Medicine Hat; at Suffield, some 26 miles northwest of that city; and at Bow island some forty miles southwest of the same point. At this last place it is reported that a flow of gas—estimated at 4,000,000 cubic feet per 24 hours—was struck at a depth of 1,900 feet.

In the north, on the Athabaska, natural gas is escaping along the banks of the river. In the Pelican Rapids well, about 180 miles north of Edmonton, an enormous flow of gas was encountered in the test hole put down by the Geological Survey. These occurrences do not, of course, prove that a continuous field exists between these points, but it reveals a wide distribution and an abundant supply of that, almost ideal, fuel.

Natural gas rights in Manitoba, Saskatchewan, Alberta, the Northwest Territories, the Yukon, etc., are the property of the Crown, and their disposal is now subject to the regulations approved by Order in Council dated the 11th day of March, 1910.

These regulations provide for a rental of 25 cents an acre for the first year and 50 cents an acre each subsequent year, lease to be for twenty-one years, renewable on conditions, and no applicant to be allowed to lease the gas rights under an area of more than 1,920 acres.

## PEAT.

The attempts hitherto made to utilize the peat resources of Canada for fuel or other purposes have not as yet resulted in any large production.

For the year 1909 the only production is that recorded by the Ontario Bureau of Mines of 60 tons made by J. McWilliam, M.D., at a plant in the township of North Dorchester, Middlesex county, Ontario.

The total production in ten years, of which record is available, has been only 3,719 tons, shown by years as follows:—

Sales of Peat during the past nine years have been reported as follows:—

	Tons.	Value.
1900.....	400	\$1,200
1901.....	220	600
1902.....	475	1,663
1903.....	1,100	3,300
1904.....	800	2,400
1905.....	80	260
1906.....	474	1,422
1907.....	50	200
1908.....	60	180
1909.....	60	240

The subject of the development of Canada's resources in her peat bogs has been given much attention by the Mines Branch of this Department, and the following extract from the Summary Report of the Director of Mines for 1909 will give an outline of the work done.<sup>1</sup>

‘It has been estimated that the known peat bogs of Canada, which are probably only a small fraction of the total, cover approximately an area of 36,000 square miles, from which about 28,000,000,000 tons of air-dried peat could be produced. This would be equal in fuel value to about 14,000,000,000 tons of coal.

‘The comparative fuel value of peat, coal, and wood is: one ton of the best coal is equal to 1.8 tons of peat, or 2.5 tons of seasoned wood.

‘Realizing that in matters industrial, it is good Canadian policy to begin where Europe left off, and armed with the practical knowledge gathered in an exhaustive study<sup>2</sup>—on the spot—of the peat industry of Northern Europe, the peat problem in Canada is being attacked systematically by the Mines Branch. Ten bogs have already been investigated, six of which are graphically described in Bulletin No. 1,<sup>3</sup> published June 30, 1909, and now in its second edition. The others are referred to in Mr. Anrep's preliminary report, and will be fully described and mapped in Bulletin No. 2, to be issued shortly.

‘Conceiving that the most effective manner in which to awaken public interest in the utilization of our peat resources would be the establishment of a plant on

<sup>1</sup> Summary Report Mines Branch, Department of Mines, 1909, p. 11.

<sup>2</sup> Peat and Lignite: Their Manufacture and Use in Europe, 1908.

<sup>3</sup> Investigation of the Peat Bogs and Peat Industry of Canada, during the season of 1908-1909.

Bulletin No. 4. Investigation of the Peat Bogs and Peat Industry of Canada during the season of 1909-1910.

a commercial scale, equipped with the machinery and appliances which have been successfully used in European practice, a peat bog of 300 acres, with an average depth of 8 feet, was acquired by the Government at Alfred, near Caledonia Springs, Prescott county, Ontario. About five miles of ditches have been dug; a storage shed to hold 300 tons of air-dried peat, a blacksmith's shop, and an office have been built.

‘The following modern machines, etc., have been installed:—

Anrep peat machine, with conveyer, having a productive capacity of 25 to 30 tons of air-dried peat per day. A 35 horse-power steam engine and boiler combined; cable appliances for transporting peat about 1,200 feet; Jacobson field press; circular track for transporting dumping cars to field press—about 1,200 feet long; eight steel dumping cars, each 0.7 tons capacity; and about 2,500 feet of 600 mm. gauge field track has been laid.

‘This plant will be in active operation at the end of April, 1910, and interested parties may see for themselves the operations of a modern plant for the economic production of peat.

### Fuel Testing Station at Ottawa.

‘During the summer of 1909, a substantial brick building, suitable for equipment with modern fuel-testing machinery and appliances, was built on Dolly Varden and Division Streets, Ottawa. There is also a storage shed at the south end of the lot, capable of holding 150 tons of peat fuel. The present installation consists of a Körting Peat Gas Producer, with the necessary cooler, scrubber, tar extractor, etc., a Körting 60 horse-power, 4 cycle gas engine; a Westinghouse 50 kw. dynamo, direct connected; and a portable resistance of 60 kw. capacity, for the purpose of absorbing the load when making tests; also a switchboard with the necessary measuring and testing instruments.

‘The main building is divided longitudinally into two parts, one of which is occupied by the peat gas producer and its auxiliary apparatus, with office at the north end; while the other half is divided by a partition wall into two compartments; one being occupied by the gas engine and dynamo; the other reserved for an ore dressing laboratory to be equipped with a 40 horse-power motor and concentrating machinery, the power for which is to be supplied by electric energy in the adjoining peat gas plant.

‘The gas generating room has been made large enough to accommodate other types of gas producers—specially designed for using bituminous coal or lignite as fuel—which it is proposed to install in the near future.’

## PETROLEUM.

The production of petroleum in Canada in 1909, estimated on the basis of the bounty payments, was 420,755 barrels, valued at \$559,604, or an average of \$1.33 per barrel. With the exception of 3,328 gallons produced in New Brunswick, the output was entirely from the Ontario oil fields.

In 1904 an act was passed by the Dominion Government, providing for the payment of a bounty of  $1\frac{1}{2}$  cents per gallon on crude petroleum produced from wells in Canada. The bounty was continued during 1910 under the 'Petroleum Bounty Act, 1909,' which provides for the payment of bounty on crude petroleum produced from oil shales mined in Canada, as well as on oil from wells in Canada. Payments are made on claims submitted by the producers of crude oil to the Minister of Trade and Commerce. These claims have to be substantiated as to quantity by the certificate of the receiving stations, tanking companies, refiners or other purchasers, as well as by the supervising officers of the Department of Trade and Commerce.

The bounty paid on the crude petroleum produced gives, therefore, as accurate a basis as is available for a reliable statement of the annual production. In 1908, the total bounty paid was \$277,193, representing a quantity of 527,987 barrels of 35 imperial gallons each. During 1909 there was paid \$220,896.50 on a production of 14,726,433 gallons or 420,755 barrels of crude oil, a decrease in production in 1909 of 107,232 barrels, or 20 per cent. The 1909 production was the lowest since 1882.

Table 1 following, shows the production of crude oil in Canada since 1901 in barrels of 35 gallons, together with the total value and average price per barrel.

PETROLEUM.—TABLE 1.

**Annual Production of Crude Petroleum since 1901.**

Year.	Barrels of 35 Gallons.	Value.	Average Price Per Barrel.
		\$	\$ cts.
1901 . . . . .	622,392	1,008,275	1 620
1902 . . . . .	530,624	951,190	1 792
1903 . . . . .	486,637	1,048,974	2 155
1904 . . . . .	503,474	935,895	1 858
1905 . . . . .	634,095	856,028	1 350
1906 . . . . .	569,753	761,760	1 337
1907 . . . . .	788,872	1,057,088	1 340
1908 . . . . .	527,987	747,102	1 415
1909 . . . . .	420,755	559,604	1 33

The figures for the years 1905 to 1909 are deduced from the bounty paid by the Federal Government, whereas the production for the years 1901 to 1904 is based on direct returns received from refineries and producers. Further details of these figures are given below in tabular form:—



### Production of Crude Oil, 1901 to 1904, based on Direct Returns.

Crude Oil.	1901.	1902.	1903.	1904.
	Bls.	Bls.	Bls.	Bls.
Received at refineries. ....	508,677	443,333	410,280	455,074
Direct sales for industrial purposes. ....	113,715	87,291	76,357	48,400
Total sales of crude oil. ....	622,392	530,624	486,637	503,474
Total sales in gallons. ....	21,783,720	18,571,840	17,032,295	17,621,590

### Production of Petroleum estimated on the basis of the bounty of 1½ cents per gallon, paid by the Dominion Government, 1905 to 1909.

Petroleum.	Bounty Paid.	Production of Crude Oil Represented.	
	\$	In Gallons.	In Barrels.
1905. ....	332,900	22,193,336	634,095
1906. ....	299,120	19,941,357	569,753
1907. ....	414,158	27,610,526	788,872
1908. ....	277,193	18,479,547	527,987
1909. ....	220,897	14,726,433	420,755

For the years previous to 1901, the production of crude oil was deduced from government inspection returns by assuming a ratio of crude to refined. The statistics of production, on this basis, for the years 1881 to 1900, are given in Table 2.

PETROLEUM.—TABLE 2.

### Canadian Oils and Naphtha inspected, and corresponding quantities of Crude Oil.

Calendar Year.	Refined Oils Inspected.	Crude Equivalent Calculated.	Ratio of Crude to Refined.	Equivalent in Barrels of 35 Gallons.	Average Price Per Barrel of Crude.	Value of Crude Oil.
	Gals.	Gals.			\$ cts.	\$
1881. ....	6,457,270	12,914,540	100:50	368,987	.....	.....
1882. ....	6,135,782	13,635,071	100:45	389,573	.....	.....
1883. ....	7,447,648	16,550,328	100:45	472,866	.....	.....
1884. ....	7,993,995	19,984,987	100:40	571,000	.....	.....
1885. ....	8,225,882	20,564,705	100:40	587,563	.....	.....
1886. ....	7,768,006	20,442,121	100:38	584,061	0 90	525,655
1887. ....	9,492,588	24,980,494	100:38	713,728	0 78	556,708
1888. ....	9,246,176	24,332,042	100:38	695,203	1 02½	713,695
1889. ....	9,472,476	24,664,144	100:38	704,690	0 92½	653,600
1890. ....	10,174,894	26,776,037	100:38	795,030	1 18	902,734
1891. ....	10,065,463	26,435,430	100:38	755,298	1 33½	1,010,211
1892. ....	10,370,707	27,291,334	100:38	779,753	1 26½	984,438
1893. ....	10,618,804	27,944,221	100:38	798,406	1 09½	874,255
1894. ....	11,027,082	29,018,637	100:38	829,104	1 00½	835,322
1895. ....	10,674,232	25,414,838	100:42	726,138	1 49½	1,086,738
1896. ....	10,684,284	25,438,771	100:42	726,822	1 59	1,155,647
1897. ....	10,434,878	24,844,995	100:42	709,857	1 42½	1,011,546
1898. ....	11,148,348	26,543,685	100:42	758,391	1 40	1,061,747
1899. ....	11,927,981	28,399,955	100:42	808,570	1 48½	1,202,020
1900. ....	13,428,422	24,867,449	100:54	710,498	1 62	1,151,007



From the above tables it will be seen that the production of petroleum in Canada reached a maximum in 1894, when the production was 829,104 barrels. During the six years following the production varied between 700,000 and 800,000 barrels. In 1904 the output fell to 486,637 barrels, increasing again in 1907 to 788,872 barrels, but falling rapidly during the past two years.

An estimate of the production of the various Ontario oil fields during 1907, 1908, and 1909 has been kindly furnished by the Imperial Oil Company and is shown in the next table.

It will be observed that the falling off in production during the past two years has been common to all the important fields, although the decrease in Tilbury and Raleigh has been most pronounced.

The figures do not agree in totals with the statistics of production published in previous tables, but they will probably serve to show the relative importance of the several fields.

### Production of Ontario Oil Fields, 1907, 1908, and 1909.

District.	1907.	1908.	1909.
	Bls.	Bls.	Bls.
Dutton.....	14,698	12,268	10,052
Leamington (Staples, Comber, and Blytheswood).....	16,210	18,117	3,367
Bothwell.....	40,556	39,820	38,707
Richardson (Chatham).....	941	2,882	2,923
Thamesville.....	1,139	853	710
Moore township.....	32,720	25,667	18,033
Oilsprings.....	55,813	61,252	60,868
East Tilbury and Raleigh.....	344,358	170,589	115,862
Romney.....	49,783	11,165	1,082
Petrolia, (includes all districts not enumerated above)....	206,285	171,019	156,581
	762,503	513,632	414,185

Another statement of production by districts is furnished by the supervisor of petroleum bounties as follows; the classification being somewhat different from that shown above, but the total agreeing more closely with those given in Table 1.

Field.	1906.	1907.	1908.	1909.
	Bls.	Bls.	Bls.	Bls.
Lambton.....	377,286	304,212	265,368	243,123
Tilbury and Romney.....	106,992	411,588	201,286	124,003
Bothwell.....	44,827	42,727	39,228	38,092
Leamington.....	39,655	6,135	9,334	5,929
Dutton.....	19,376	14,977	13,743	9,513
Thamesville.....	175	237		
Comber.....	651			
Total.....	588,962	779,876	528,959	420,660

The oil refineries of Canada of which there are three, viz., The Imperial Oil Company, Sarnia, The Canadian Oil Company, and the British American Oil Company, now use considerable quantities of imported crude oils as well as oils from Canadian wells. The amount of crude oil distilled during 1909 was 35,530,918 gallons, of which 19,515,391 gallons were imported and 16,015,527 gallons obtained from Canadian wells.

The production of refined products, etc., is shown in the following table as published by the Ontario Bureau of Mines, and includes returns only from the first two firms mentioned above.

### PETROLEUM.—TABLE 3.

#### Petroleum and Petroleum Products, 1906 to 1909.

Schedule.		1906.	1907.	1908.	1909.
Crude distilled.....	Imp. gal.	36,134,349	34,961,706	34,675,120	35,530,918
Value distilled products.....	\$	2,506,177	2,568,464	2,347,680	2,501,384
Illuminating oil.....	Imp. gal.	16,125,450	18,319,233	17,604,920	17,902,254
Lubricating oil.....	"	4,351,818	3,931,767	3,384,940	3,856,778
Benzine and naphtha.....	"	3,497,954	4,132,239	3,667,997	3,930,691
Gas and fuel oils and tar.....	"	5,961,834	5,632,608	4,461,186	4,687,588
Paraffin wax and candles.....	Lbs.	5,011,467	5,132,394	5,400,003	7,092,278
Workmen employed.....	No.	496	435	430	436
Wages paid.....	\$	308,986	265,316	247,829	261,014

Table 4 shows the amount of refined oil inspected, both that refined in Canada and that imported. Since 1904, large quantities of imported crude oil have been used in Canadian refineries, so that the figures since that date do not show the relative amounts that can be credited to Canadian oil fields.

## PETROLEUM.—TABLE 4.

## Total Amount of Oil Inspected, Canadian and Imported.

Fiscal Year.	Made in Canada.	Imported.	Total.	Canadian.	Imported.
	Gals.	Gals.	Gals.	Per cent.	Per cent.
1881 .....	6,406,783	476,784	6,883,567	93·1	6·9
1882 .....	5,910,747	1,351,412	7,262,159	81·4	18·6
1883 .....	6,970,550	1,190,828	8,161,378	85·4	14·6
1884 .....	7,656,001	1,142,575	8,798,586	87·0	13·0
1885 .....	7,661,617	1,278,115	8,939,732	85·7	14·3
1886 .....	8,149,472	1,327,616	9,477,088	86·0	14·0
1887 .....	8,243,962	1,665,604	9,909,566	83·2	16·8
1888 .....	9,545,895	1,821,342	11,367,237	84·0	16·0
1889 .....	9,462,834	1,767,812	11,230,646	84·3	15·7
1890 .....	10,121,210	2,020,742	12,141,952	83·4	16·6
1891 .....	10,270,107	2,022,002	12,292,109	83·6	16·4
1892 .....	10,238,426	2,429,445	12,667,871	80·8	19·2
1893 .....	10,683,806	2,641,690	13,325,496	80·2	19·8
1894 .....	10,824,270	5,633,222	16,457,492	65·8	34·2
1895 .....	10,936,992	5,650,994	16,587,986	65·9	34·1
1896 .....	10,533,951	5,807,991	16,341,942	64·5	35·5
1897 .....	10,506,526	6,248,743	16,755,269	62·7	37·3
1898 .....	10,796,847	6,880,734	17,677,581	61·1	38·9
1899 .....	11,005,804	7,232,348	18,238,152	60·3	39·7
1900 .....	13,014,713	*8,216,207	21,230,920	61·3	38·7
1901 .....	12,674,977	*9,232,165	21,907,142	57·9	42·1
1902 .....	10,494,874	*10,916,396	21,411,270	49·0	51·0
1903 .....	8,615,892	*14,479,176	23,095,068	37·3	62·7
1904 .....	7,292,113	*17,369,930	24,662,043	29·6	70·4
1905 .....	17,520,035	*10,284,053	27,804,088	63·0	37·0
1906 .....	18,634,155	*9,255,200	27,889,355	66·8	33·2
1907 (9 months) .....	15,365,933	*6,879,494	22,245,427	69·1	30·9
1908 .....	22,887,026	*6,295,457	29,182,483	78·4	21·6
1909 .....	19,989,886	*10,610,882	30,600,768	65·0	35·0
1910 .....	23,213,574	*8,652,285	31,865,859	73·0	27·0

\* Item (c) Table 6.

The exports of oil are very small, the available statistics being shown in Table 5.

The imports of petroleum and petroleum products, on the other hand, have been steadily growing, and during the fiscal year 1909, aggregate a total value of \$2,576,025, besides wax and wax candles to the value of \$27,601.

Statistics of imports are shown in Tables 6 to 10.

## PETROLEUM.—TABLE 5.

## Exports of Crude and Refined Petroleum, 1881-1909.

Calendar Year.	CRUDE OIL.		REFINED OIL.		TOTAL.	
	Gals.	Value.	Gals.	Value.	Gals.	Value.
		\$		\$		\$
1881					501	99
1882					1,119	286
1883					13,283	710
1884					1,098,090	30,168
1885					337,967	10,562
1886					241,716	9,855
1887					473,559	13,831
1888					196,602	74,542
1889					235,855	10,777
1890					420,492	18,154
1891	446,770	18,471	585	104	447,355	18,575
1892	310,387	12,945	1,146	100	311,533	13,045
1893	107,719	3,696	2,196	394	109,915	4,090
1894	53,985	2,773	5,297	513	59,282	3,286
1895	22,831	1,044	10,237	2,023	33,068	3,067
1896	601	101	7,489	999	8,090	1,100
1897			342	49	342	49
1898	96	4	12,735	3,001	12,831	3,005
1899			8,559	859	3,425	859
1900	40	2	8,559	394	8,559	2,396
1901	14,168	691	375	66	14,543	757
1902	400	40	626	146	1,026	186
1903	350	15	1,013	190	1,363	205
1904	4,207	213	2,126	470	6,333	683
1905	35	2	7,228	2,078	7,263	2,080
1906	900	141	8,938	1,401	9,838	1,542
1907	1,125	102	3,132	575	4,257	677
1908			296	71	296	71
1909			7,768	934	7,768	934

PETROLEUM.—TABLE 6.

Imports of Petroleum and Products thereof, during the Fiscal Years ending 1908 and 1909.

Products.	1908 (12 mos. ending March.)		1909 (12 mos. ending March.)	
	Gals.	Value.	Gals.	Value.
		\$		\$
(a) Petroleum crude, fuel and gas oils (8235 specific gravity).....	24,866,963	889,080	31,594,212	1,321,938
(b) Crude petroleum, gas oils (other than benzine and gasoline).....	52,605	5,900	3,515	420
(c) Coal and kerosene, distilled, purified, or refined.....	6,295,457	503,829	10,610,882	785,418
(d) Illuminating oils composed wholly or in part of the products of petroleum, coal, shale, or lignite, costing more than 30 cents per gallon.....	2,232	1,035	3,597	1,818
(e) Lubricating oils composed wholly or in part of petroleum, costing less than 25 cents per gallon.....	3,262,846	411,172	2,319,710	311,547
(f) Products of petroleum.....	1,834,615	195,003	1,473,146	154,834
Total.....	36,314,718	2,006,019	46,005,062	2,576,025

(a) Free. (b) Duty 1½c. per gal. (c), (e), and (f) Duty 2½c. per gal. (d) 20 per cent.

PETROLEUM.—TABLE 7.

Imports of Petroleum and Products thereof, years 1880-1909.

Fiscal Year.	Gals.	Value.	Fiscal Year.	Gals.	Value.
		\$			\$
1880.....	687,641	131,359	1895.....	7,577,674	525,372
1881.....	1,437,475	262,168	1896.....	8,005,891	735,913
1882.....	3,007,702	398,031	1897.....	8,415,302	697,169
1883.....	3,086,316	358,546	1898.....	9,074,311	724,519
1884.....	3,160,282	380,082	1899.....	10,394,208	763,303
1885.....	3,767,441	415,195	1900.....	9,633,647	864,833
1886.....	3,819,146	421,833	1901.....	11,082,822	982,640
1887.....	4,290,003	467,003	1902.....	13,220,005	1,107,207
1888.....	4,523,056	408,025	1903.....	18,799,312	1,643,371
1889.....	4,650,274	484,462	1904.....	24,521,115	2,152,623
1890.....	5,075,650	515,852	1905.....	35,296,332	2,151,514
1891.....	5,071,386	498,330	1906.....	32,624,410	1,908,177
1892.....	5,649,145	475,732	1907 (9 months).....	23,645,861	1,480,261
1893.....	6,002,141	446,389	1908.....	36,314,718	2,006,019
1894.....	6,597,108	439,938	1909.....	46,005,062	2,576,025



## PETROLEUM.—TABLE 8.

## Imports of Crude and Manufactured Oils, other than Illuminating, 1881-1909.

Fiscal Year.	Gals.	Fiscal Year.	Gals.
1881..	960,691	1896..	1,079,965
1882..	1,656,290	1897..	802,286
1883..	1,895,488	1898..	1,047,026
1884..	2,017,707	1899..	1,017,278
1885..	2,489,326	1900..	1,406,700
1886..	2,491,530	1901..	1,838,966
1887..	2,624,399	1902..	2,296,353
1888..	2,701,714	1903..	4,316,010
1889..	2,882,462	1904..	7,141,109
1890..	3,054,908	1905..	25,002,047
1891..	3,049,384	1906..	23,365,674
1892..	3,047,199	1907 (9 months)...	16,761,713
1893..	1,481,749	1908..	30,017,029
1894..	1,860,829	1909..	35,390,583
1895..	1,106,993		

The figures for the years from 1881 to 1894, inclusive, represent the total imports of petroleum and products, less the quantity of imported illuminating oils, inspected by the Inland Revenue Department. For 1895 and subsequent years, the table is composed of items (a), (b), (c), and (f) of Table 6.

## PETROLEUM.—TABLE 9.

## Imports of Paraffin Wax, 1883-1909.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1883..	43,716	5,166	1897..	138,703	7,945
1884..	39,010	6,079	1898..	103,570	5,987
1885..	59,967	8,123	1899..	92,242	4,025
1886..	62,035	7,953	1900..	47,400	3,529
1887..	61,132	6,796	1901..	118,848	9,639
1888..	53,862	4,930	1902..	225,885	12,750
1889..	63,229	5,250	1903..	592,642	28,674
1890..	239,229	15,844	1904..	418,967	18,440
1891..	753,854	50,275	1905..	81,992	7,795
1892..	733,873	48,776	1906..	112,612	9,721
1893..	452,916	38,935	1907 (9 months)...	55,021	5,922
1894..	208,099	15,704	1908..	62,308	8,041
1895..	163,817	11,579	1909..	129,631	12,795
1896..	150,287	10,042			

## PETROLEUM.—TABLE 10.

## Imports of Paraffin Wax Candles, 1880-1909.

Fiscal Year	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	10,445	2,269	1895.....	19,448	2,541
1881.....	7,494	1,683	1896.....	25,787	4,072
1882.....	5,818	1,428	1897.....	25,114	2,929
1883.....	7,149	1,734	1898.....	60,802	4,427
1884.....	8,755	2,229	1899.....	62,331	5,856
1885.....	9,247	2,449	1900.....	27,663	3,671
1886.....	12,242	2,587	1901.....	44,562	3,588
1887.....	21,364	3,611	1902.....	51,120	5,752
1888.....	22,054	2,829	1903.....	83,377	9,025
1889.....	8,038	1,337	1904.....	83,471	9,078
1890.....	7,233	1,186	1905.....	137,353	15,293
1891.....	10,598	2,116	1906.....	148,808	15,804
1892.....	9,259	1,952	1907 (9 months).....	38,900	5,088
1893.....	8,351	1,735	1908.....	156,934	20,035
1894.....	10,818	1,685	1909.....	110,848	14,806

While oil fields of commercial value do not as yet appear to have been developed in Western Canada, the seepages of oil found in Southern Alberta and British Columbia, and the existence of large areas of tar sands in the northern part of Alberta, have led to a great deal of prospecting in recent years, in the hope of finding valuable oil fields. The results of the work of the Geological Survey in this Province have been somewhat favourable to this hope. The oil prospects of Alberta form the subject of a special review by the Director of the Survey in his Summary Report for 1909, from which the following is extracted. The geology of the Province is first summarized.

‘From this general description, it will be seen that the Cretaceous rocks which underlie almost the whole of Alberta have as their basal member, where exposed on the plains, the Dakota sandstone, a porous rock and a suitable reservoir for oil. It, in turn, along its exposed (northern and eastern) borders at least, rests upon the Devonian, and is overlain by shales that would form an impervious cover which might retain any oil that found its way into the Dakota sands.

‘The Dakota sands are exposed along the Athabaska river and elsewhere in the north, where they are charged with tar to the extent of 12 per cent of the whole mass. The tar represents the residuum of petroleum which has escaped to the air along the exposed edges of the rocks. Natural gas and some petroleum are still escaping. McConnell<sup>1</sup> estimates the area of Tar sands seen by him to amount to 1,000 square miles, which, with an estimated thickness of 150 feet, would give 28.4 cubic miles of Tar sands, or 6.5 cubic miles of tar, equal to 4,700,000,000 tons of bitumen. Of course, the Tar sands have not been fully explored. A large amount of oil has escaped, but it is altogether improbable that this process has gone on indefinitely and that all has been drained off, for the hardening of the oil to tar effectively seals the openings for escape, and only the area near the exposed edges is likely to have lost its oil content. That the distri-

<sup>1</sup> Report on a portion of District of Athabasca, 1893, p. 65 D, G.S.C. Ann. Rep., Pt. I, Vol. V.

bution of oil is probably extensive is indicated by the finding of tar in sands near the surface, far to the south, in the Edmonton country, apparently formed by the limited escape of oil from minor fractures in the rocks. Oil seepages also occur in southwestern Alberta, in South Kootenay pass, and the Flathead valley.

'Southward from the northern edge of the Cretaceous, the covering of later Cretaceous formations over the Dakota sands becomes thicker. One of these formations, the Belly River, is thick and lens-shaped, and Calgary is just about over the centre of the lens. Most of the borings have been put down near the railways where, except in the east, the Dakota sands are far below the surface, and have failed to reach this, presumably, oil-bearing horizon. The best place to test is, of course, in the north, where the covering over the Dakota sands is thinner, and where the presence of oil is indicated by tar in the sands, yet the spot chosen should be far enough back to be beyond the influence of the leaks along the exposed edges. The Geological Survey put down three test holes, one at Victoria, one at Athabaska Landing, and one at Pelican rapids. The latter represented the best judgment of the Survey as to the location of a test hole. The two former, about 1,800 feet deep, failed to reach the Dakota owing to the great thickness of the cover at these points. Farther north, the Pelican well, at a depth of about 800 feet, reached the top of the Dakota and struck a tremendous flow of gas. Pushed 20 feet farther, it struck another heavy gas vein and some oil. The escaping gas froze the oil on the drilling tools and prevented further progress, so that the Dakota sands were not proved as to their containing commercial reservoirs of oil. None of the wells sunk about Medicine Hat, Edmonton, or Calgary, have penetrated deep enough to test the oil possibilities. The two Calgary wells, sunk to 3,400 feet each, were still considerably above the Dakota, and separated from it by impervious shales, but here the upper Cretaceous rocks are exceptionally thick.

'In southwestern Alberta, in the Pincher Creek district, oil is being prospected for in two areas, on the south branch of the south fork of Oldman river, and on Oil creek, a tributary of Watertown lakes. The Survey has done no recent work in this district, but in the first field the rocks are, so far as can be learned, Cretaceous. The rocks on Oil creek were regarded by Dawson as Cambrian, a view which Daly supports, but Dr. Walcott, of the Smithsonian Institution, believes them to be Pre-Cambrian—corresponding to the Belt terrane of Bailey Willis. On Oil creek a green schist is exposed from which there is a seepage of oil. The oil has a paraffin base, is of excellent quality, and free from sulphur. The Pincher Creek Oil Company has two shallow wells in this shale which have not been shot. These yield  $\frac{1}{2}$  to 2 barrels of oil per day, according to information deemed reliable. As this shale outcrops at the surface, apparently over a fairly wide extent of country, it would seem that by sinking a number of shallow wells into it and torpedoing them to form catchment basins, a considerable quantity of oil might be collected from it. Three other companies are prospecting here: one has a well down 1,020 feet, which is stated to have yielded at the outset 300 barrels per day. A second well, at a depth of 1,170 feet, is estimated

by the drillers to be capable of producing 25 barrels per day. These wells have not yet been shot. Three companies are prospecting on the south fork of Oldman river: one has three holes down, the deepest of which is reported to be down 1,400 feet.

‘These districts lie within the front range of the mountains. Some uncertainty as to the oil prospects of this section is introduced by the occurrence of heavy overthrust faults which may have allowed oil reservoirs that once existed to drain off. Outside the mountains near Pincher Creek, an anticline, parallel to the mountains, appears to exist. While this structure is favourable for oil reservoirs, the thickness of the upper Cretaceous rocks presents difficulties, and there is a possibility that the Fernie shales and Carboniferous rocks may extend out from the mountains and form an impervious blanket which prevented the oil from reaching the Dakota horizon. The driller should be prepared to go as deep as 3,500 feet, and the soft shales, etc., of the upper Cretaceous present many difficulties in such deep boring. At Calgary borings would probably have to exceed 4,000 feet to test the possibilities of the district.

‘Near Edmonton the thickness of the rocks above the Dakota is not definitely known, but it is probably considerably over 2,500 feet, as the holes at Athabaska Landing and Victoria, 1,800 feet deep, did not penetrate to the Dakota, and at both these points the thickness of the overlying formations is less than at Edmonton. In the vicinity of Pelican rapids a hole about 1,000 feet in depth is required. Eastward the Cretaceous also thins out, so that at Medicine Hat holes of 1,800 to 2,000 feet in depth would probably reach the Dakota.

‘The presence of immense tar fields along the outcropping edges of the Dakota in the north; the occurrence near Egg lake and other points near Edmonton of Tar sands which seem to have been formed by oil escaping from fissures; the oil seepages from the disturbed rocks in the mountains of southwestern Alberta, and the heavy veins of gas encountered by boring in northern and eastern Alberta, warrant the belief that good oil fields may be found in Alberta. The best points to prospect would appear to be: in the south, near Pincher Creek (where it will be necessary to be prepared for deep drilling); in the east, where it would be reasonably sure that gas, at any rate, would be struck, or in the north at about the latitude of Pelican rapids, where test holes would not have to be deep, and where the Dakota is known to have had large supplies of oil. The neighbourhood of Pelican rapids would be far enough back from the outcropping edges to find sand that may not have been drained of its oil. The proposed railway to Fort McMurray would render this district accessible.

‘About Fort McMurray and north of that point, the Devonian is exposed without a Cretaceous cover. Although the oil, which formed the Tar sands of the Dakota, probably came from the Devonian, and although the Devonian almost everywhere in the Mackenzie valley is more or less petroliferous, there are no grounds for supposing that the Devonian would be a particularly favour-



able formation to prospect, for oil escapes so readily, and in this case is known to have escaped in such quantities that it is uncertain that commercial reservoirs have been retained. It cannot, however, be stated that an undrained oil horizon does not exist in it, but only that prospecting in it is a gamble. If oil were found in the Dakota about Pelican and some information gained as to its distribution, prospecting could be continued southward, in the districts where deeper drilling would be necessary, with the element of chance to some extent eliminated.'

Regulations have been adopted by the Dominion Government for the disposal of petroleum and natural gas rights, and of tar sands, which are outlined as follows:—

### **Petroleum Regulations.**

'Regulations for the disposal of petroleum and natural gas rights, the property of the Crown, in Manitoba, Saskatchewan, Alberta, the Northwest Territories, the Yukon Territory, and within the tract containing three and one-half ( $3\frac{1}{2}$ ) million acres of land acquired by the Dominion Government from the Province of British Columbia, and referred to in sub-section (b) of section 3 of the Dominion Lands Act, approved by Order in Council, dated the 11th day of March, 1910.'

These regulations provide for the leasing of petroleum and gas rights under an area of not more than 1,920 acres to one applicant for a period of twenty-one years, subject to a rental of twenty-five (25) cents an acre for the first year, and fifty (50) cents an acre for each subsequent year.

The lessee is required to have upon the lands leased, within one year of the date of the lease, such machinery as the Minister may consider necessary for the carrying on of prospecting operations, and is required to begin boring operations within 15 months of the date of the lease, which shall be continued with reasonable diligence, with a view to the discovery of oil or natural gas.

### **Tar Sand Regulations.**

Regulations for the disposal of the tar sands, the property of the Crown in that portion of the Province of Alberta lying north of township 80, and between the 4th and 5th initial meridians, were approved by Order in Council dated 14th day of February, 1910.

These provide for the leasing of an area not exceeding 1,920 acres to one applicant for a period of twenty-one years, subject to an annual rental of fifty (50) cents per acre.

After the lease has been in existence one year, the lessee may, on one year's notice, be required to begin active operations, and may be required to excavate and produce ready for shipment or treatment, a quantity not exceeding ten tons per annum, for each acre leased. Copies of the full text of the regulations may be obtained from the Department of the Interior.



## PHOSPHATE.

The greater part of the production of phosphate in Canada results from the exploitation of mica deposits in which apatite occurs as an associated mineral, and is saved as a by-product.

This phosphate rock or apatite, is used mainly for the manufacture of fertilizers and also for the production of phosphorus, this substance being manufactured by the Electric Reduction Company of Buckingham, Province of Quebec.

The Canadian phosphate industry during the last fifteen years has been very intermittent and spasmodic, as is shown by the irregularity of the annual production, which varies between the wide limits of 600 and 3,000 tons. Previous to 1892 this industry was very flourishing but the discovery of immense deposits in the United States, which could be cheaply mined, caused it practically to collapse.

In 1909 the shipments were reported as 998 tons, valued at \$8,054, or an average of \$8.07 per ton.

Statistics of production and exports are shown in Tables 1 and 2 following:—

PHOSPHATE.—TABLE 1.

### Annual Production.

Calendar Year.	Tons.	Value.	Average Value per ton.	Calendar Year.	Tons.	Value.	Average Value per ton.
		\$	\$ cts.			\$	\$ cts.
1886.....	20,495	304,338	14 85	1898.....	733	3,665	5 00
1887.....	23,690	319,815	13 50	1899.....	3,000	18,000	6 00
1888.....	22,485	242,285	10 77	1900.....	1,415	7,105	5 02
1889.....	30,988	316,662	10 21	1901.....	1,033	6,286	6 07
1890.....	31,753	361,045	11 37	1902.....	856	4,953	5 79
1891.....	23,588	241,603	10 24	1903.....	1,329	8,214	6 18
1892.....	11,932	157,424	13 20	1904.....	817	4,590	5 62
1893.....	8,198	70,942	8 65	1905.....	1,300	8,425	6 48
1894.....	6,861	41,166	6 00	1906.....	850	6,375	7 50
1895.....	1,822	9,565	5 25	1907.....	824	6,018	7 30
1896.....	570	3,420	6 00	1908.....	1,596	14,794	9 26
1897.....	908	3,984	4 39	1909.....	998	8,054	8 07

## PHOSPHATE.—TABLE 2.

## Exports.

Calendar Year.	ONTARIO.		QUEBEC.		TOTALS.	
	Tons.	*Value.	Tons.	*Value.	Tons.	*Value.
		\$		\$		\$
1878.....	824	12,278	9,919	195,831	10,743	208,109
1879.....	1,842	20,565	6,604	101,470	8,446	122,035
1880.....	1,387	14,422	11,673	173,664	13,060	190,086
1881.....	2,471	36,117	9,497	182,339	11,968	218,456
1882.....	568	6,338	16,585	302,019	17,153	308,357
1883.....	50	500	19,666	427,168	19,716	427,668
1884.....	763	8,890	20,946	415,350	21,709	424,240
1885.....	434	5,962	28,535	490,331	28,969	496,293
1886.....	644	5,816	19,796	337,191	20,460	343,007
1887.....	705	8,277	22,447	424,940	23,152	433,217
1888.....	2,643	30,247	16,133	268,362	18,776	298,609
1889.....	3,547	38,833	26,440	355,935	29,987	394,768
1890.....	1,866	21,329	26,591	478,040	28,457	499,369
1891.....	1,551	16,646	15,720	368,015	17,271	384,661
1892.....	1,501	12,544	9,981	141,221	11,482	153,765
1893.....	1,990	11,550	5,748	56,402	7,738	67,952
1894.....	1,980	10,560	3,470	29,610	5,450	40,170
1895.....			250	2,500	250	2,500
1896.....	1	5	299	2,990	300	2,995
1897.....	70	450	165	400	235	850
1898.....	21	240	702	8,000	723	8,240
1899.....	215	1,850	93	1,725	308	3,575
1900.....					Nil	Nil
1901.....					6	120
1902.....					70	1,880
1903.....					1	20
1904.....					191	5,348
1905.....					40	1,253
1906.....						
1907.....						
1908.....					1	30
1909.....					895	15,735

\* These values do not compare with those in Table 1; the spot value is adopted for the production, while the exports are valued upon quite a different basis.

There appears to be some demand for phosphate in Great Britain, but the price offered does not seem to be sufficiently high to afford any prospect for the development of trade in this direction. From \$9 to \$10 per ton c.i.f. British ports is offered for phosphate running 80 per cent phosphoric acid, whereas higher prices than these are now being paid at Buckingham, Que., without attracting sufficient mineral to supply the demand.

## PYRITES.

The total shipments of pyrites in 1909 are reported as 64,644 tons, valued at \$222,812, as compared with shipments of 47,336 tons, valued at \$224,824, in 1908.

The 1909 production included 35,300 tons copper pyrites from Quebec, and 29,344 tons of iron pyrites from four properties in Ontario. In 1908, 26,598 tons of copper pyrites ores were shipped from Quebec and 20,738 tons of iron pyrites from Ontario mines.

Statistics of production and exports of pyrites and of imports of brimstone and crude sulphur are shown in the following tables:—

PYRITES.—TABLE 1.

### Annual Production.

Calendar Year.	Tons, 2,000 lbs.	Value.	Calendar Year.	Tons, 2,000 lbs.	Value.
		\$			\$
1886.....	42,906	193,077	1898.....	32,218	123,872
1887.....	38,043	171,194	1899.....	27,687	110,748
1888.....	63,479	285,656	1900.....	40,031	155,164
1889.....	72,225	307,292	1901.....	35,261	130,544
1890.....	49,227	123,067	1902.....	35,616	138,939
1891.....	67,731	203,193	1903.....	33,982	127,713
1892.....	59,770	179,310	1904.....	37,180	134,033
1893.....	58,542	175,626	1905.....	33,339	125,486
1894.....	40,527	121,581	1906.....	42,743	169,990
1895.....	34,198	102,594	1907.....	46,243	212,491
1896.....	33,715	101,155	1908.....	47,336	224,824
1897.....	38,910	116,730	1909.....	64,644	222,812

PYRITES.—TABLE 2.

### Imports:—Brimstone and Crude Sulphur.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	1,775,489	27,401	1895.....	4,900,225	56,965
1881.....	2,118,720	33,956	1896.....	6,934,190	63,973
1882.....	2,375,821	40,329	1897.....	8,672,751	87,719
1883.....	2,336,085	36,737	1898.....	38,026,798	373,786
1884.....	2,195,735	37,463	1899.....	24,517,026	265,799
1885.....	2,248,986	35,043	1900.....	21,128,656	215,433
1886.....	2,922,043	43,651	1901.....	23,856,651	270,608
1887.....	3,103,644	38,750	1902.....	24,640,735	325,307
1888.....	2,048,812	25,318	1903.....	24,412,737	259,123
1889.....	2,427,510	34,006	1904.....	19,364,730	204,663
1890.....	4,440,799	44,276	1905.....	23,435,140	242,251
1891.....	3,601,748	46,351	1906.....	43,047,672	436,156
1892.....	4,769,759	67,095	1907 (9 months)....	25,854,615	277,439
1893.....	6,381,203	77,216	1908.....	51,806,739	517,249
1894.....	5,845,463	61,558	1909*.....	44,049,172	426,569

\* Brimstone, crude or in roll or flour, or sulphur in roll or flour.

## PYRITES.—TABLE 3.

## Exports of Pyrites.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1894.....	8,532	33,205	1902.....	18,584	50,178
1895.....	7,705	33,298	1903.....	21,067	59,604
1896.....	15,002	33,837	1904.....	18,279	49,911
1897.....	15,096	30,812	1905.....	19,755	55,767
1898.....	9,804	26,387	1906.....	26,050	65,349
1899.....	15,599	34,084	1907.....	25,056	80,139
1900.....	17,620	41,182	1908.....	17,283	96,600
1901.....	24,971	57,263	1909.....	35,798	156,644

Following is a list of firms reporting shipments during 1909:—

The Eustis Mining Company, Eustis, Que.

The Nichols Chemical Company of Canada, Limited, Sulphide, Ont.

The Canadian Pyrites Company, Madoc, Ont.

The Northern Pyrites Company, Dinorwic, Ont.

The Northland Mining Company, Limited, London, Ont.

## SALT.

Salt production in Canada has been increasing steadily for a number of years and the 1909 production is the largest recorded. The industry is still confined to the salt fields of southwestern Ontario, although there was at one time a very small production in New Brunswick and Manitoba.

The total sales of Canadian salt in 1909 were 84,037 tons, valued at \$415,219 exclusive of packages; as compared with 79,975 tons, valued at \$378,798, in 1908, showing an increased production of 4,062 tons or 5 per cent in 1909.

The value of the packages used in 1909 was \$175,612, and in 1908, \$168,019.

Detailed statistics of the production during the past five years, showing the total sales of salt, the value of the sales (exclusive of packages), the values of the packages used, stock in manufacturers' hands at the end of each year, number of men employed and wages paid, are given in Table 1, while the total annual production since 1886 is given in Table 2.

SALT.—TABLE 1.

### Detailed Statistics of Production, 1905-1909.

—		1905.	1906.	1907.	1908.	1909.
Sales of salt.....	Tons	67,340	76,762	72,697	79,975	84,037
Value of salt, (exclusive of packages)...	\$	320,858	329,130	342,315	378,798	415,219
Value of packages.....	\$	113,004	147,705	149,823	168,019	175,612
Stock in manufacturer's hands at end of year..	Tons	5,206	6,365	3,923	5,631	2,671
Men employed.....	No.	191	210	215	207	185
Wages paid.....	\$	83,391	92,000	95,667	95,575	96,116

SALT.—TABLE 2.

### Annual Production, 1886-1909.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	62,359	227,195	1898.....	57,142	248,639
1887.....	60,173	166,394	1899.....	59,339	254,390
1888.....	59,070	185,460	1900.....	62,055	279,458
1889.....	32,832	129,547	1901.....	59,428	262,328
1890.....	43,754	198,857	1902.....	64,456	292,581
1891.....	45,021	161,179	1903.....	62,452	297,517
1892.....	45,486	162,041	1904.....	69,477	321,778
1893.....	62,324	195,926	1905.....	67,340	320,858
1894.....	57,199	170,687	1906.....	76,720	329,130
1895.....	52,376	160,455	1907.....	72,697	342,315
1896.....	43,960	169,693	1908.....	79,975	378,798
1897.....	51,348	225,730	1909.....	84,037	415,219



As will be seen by the above table, the salt industry is slowly but steadily developing; the figures of production for 1909 being the highest yet recorded.

The salt fields of western Ontario are very extensive. The salt beds form part of the Onondaga formation, of Silurian age, and the saliferous horizons underlie a territory extending from Kincardine to Lake Erie, bordering Lake Huron and the Detroit river. This basin measures an extreme length of 150 miles, with a maximum width of 40 miles at the centre and tapering towards the ends. This would cover an area of 2,500 square miles. An idea of the immense deposits of salt contained in this area may be gathered from the fact that a bore hole sunk at Goderich, in Huron county, to a depth of 1,517 feet, went through six beds of salt, ranging in thickness from 6 feet to 35 feet, whereas, at Windsor, in a well 1,672 feet deep, four beds were traversed, one of which is said to measure 250 feet in thickness.

So far, the salt industry of western Ontario is confined to production of salt for the trade, but with such deposits, which are practically inexhaustible, there is a wide field for the establishment of a soda industry. The imports into Canada of the products of the soda industry reach a very high figure, as may be gathered from the following items of importations during the calendar year ending December 31, 1909:—

	Lbs. imported,	Value.
		\$
Soda, ash, or barilla.....	30,567,464	249,882
Soda bichromate.....	367,271	21,501
Caustic soda in packages, 25 lbs. or more.....	11,100,980	218,728
Salt soda.....	11,318,633	106,440
Sulphate of soda.....	1,961,561	7,611
		604,162

As at present carried on in western Ontario, the salt industry consists essentially in the production of table, dairy, and coarse salt, and a small quantity of land salt. These are manufactured by forcing water down bore holes sunk to the rock salt bed, through a casing inside of which is a pipe of smaller diameter. A powerful pump forces water down the outer tube; this dissolves the salt, eventually forming large cavities at the bottom of the well, which offer a great surface of salt to the action of the water.

The water forced downwards is charged to saturation in the salt cavity, and, as the rock is not fissured or porous, this brine is forced upwards through the inner tube. After a process of purification and settling, this brine is evaporated either in vacuum pans or in large open air vats, and after passing through mechanical dryers or over drying floors, the salt is ready for the market.

The following are analyses of brines obtained from wells in these salt fields.  
The figures are for 1,000 parts in weight:—

### Analyses of Brines.<sup>1</sup>

	Sodium chloride.	Calcium chloride.	Mag- nesium chloride.	Sulphate of lime.	Specific gravity.	Degrees of salometer.
Goderich, sample taken August 19, 1866.....	259·000	0·432	0·254	1·882	1·205	100
Goderich, same well as above, November 5, 1868.....	236·410	0·190	0·410	4·858	1·187	92
Clinton well.....	204·070	0·470	0·184	5·583	1·157	80
Kincardine.....	241·350	0·840	0·230	3·264	1·191	94

<sup>1</sup> Analyses by Dr. T. Sterry Hunt, laboratory, Geological Survey of Canada.

The following tables give the statistics of the exports and imports of salt  
since 1880:—

SALT.—TABLE 3.

### Exports.

Calendar Year.	Bushels.	Value.	Calendar Year.	Bushels.	Value.
		\$			\$
1880.....	467,641	46,211	1896.....	3,842	899
1881.....	343,208	44,627	1897.....	5,383	1,193
1882.....	181,758	18,350	1898.....	5,202	1,252
1883.....	199,733	19,492	1899.....	11,205	2,773
1884.....	167,029	15,291	1900.....	37,653	8,997
1885.....	246,794	18,756	1901.....	39,224	6,510
1886.....	224,943	16,886	1902.....	9,331	3,798
1887.....	154,045	11,526		Lbs.	
1888.....	15,251	3,987	1903.....	1,915,648	5,927
1889.....	8,557	2,390	1904.....	1,006,036	4,186
1890.....	6,605	1,667	1905.....	1,447,728	6,112
1891.....	5,290	1,277	1906.....	618,707	3,437
1892.....	2,000	504	1907.....	2,222,542	7,709
1893.....	4,940	1,267	1908.....	529,229	3,840
1894.....	4,639	1,120	1909.....	276,765	2,488
1895.....	4,865	959			

SALT.—TABLE 4.

## Imports:—Salt Paying Duty.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	726,640	3,916	1895.....	8,498,404	29,881
1881.....	2,588,465	6,355	1896.....	7,665,257	24,550
1882.....	3,679,415	12,318	1897.....	11,911,766	33,470
1883.....	12,136,968	36,223	1898.....	11,068,785	32,792
1884.....	12,770,950	38,949	1899.....	11,781,453	32,839
1885.....	10,397,761	31,726	1900.....	11,023,337	30,180
1886.....	12,266,021	39,181	1901.....	11,625,688	34,087
1887.....	10,413,258	35,670	1902.....	13,892,849	39,605
1888.....	10,509,799	32,136	1903.....	14,554,693	41,785
1889.....	11,190,088	38,968	1904.....	29,779,183	73,826
1890.....	15,135,109	57,549	1905.....	8,473,868	58,056
1891.....	15,140,827	59,311	1906.....	21,366,064	59,805
1892.....	18,643,191	65,963	1907..... (9 mos.)	21,834,435	58,553
1893.....	21,377,339	79,838	1908.....	31,019,400	79,341
1894.....	15,867,825	53,336	1909.....	31,653,900	83,660

	Duty.	1909.	
		Lbs.	Value.
			\$
Salt, coarse, N.E.S.....	5c. per 100 lbs. }	19,197,300	32,036
Salt, fine, in bulk.....	5c. " }		
Salt, N.E.S., in bags, barrels or other packages.....	7½c. " }	12,456,600	51,624
Total.....		31,653,900	83,360

SALT.—TABLE 5.

## Imports:—Salt not Paying Duty.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	212,714,747	400,167	1895.....	201,691,248	332,711
1881.....	231,640,610	488,278	1896.....	205,005,100	338,888
1882.....	166,183,962	311,489	1897.....	215,844,484	312,117
1883.....	246,747,113	386,144	1898.....	202,634,927	293,410
1884.....	225,390,121	321,243	1899.....	183,046,365	267,520
1885.....	171,571,209	255,719	1900.....	193,554,550	295,253
1886.....	180,205,949	255,359	1901.....	216,271,603	339,887
1887.....	203,042,332	285,455	1902.....	238,648,737	385,629
1888.....	184,166,986	220,975	1903.....	232,708,675	361,185
1889.....	180,847,800	253,009	1904*.....	198,634,047	338,082
1890.....	158,490,075	252,291	1905*.....	196,907,500	340,954
1891.....	195,491,410	321,239	1906*.....	203,080,000	352,214
1892.....	201,831,217	314,995	1907†.....	139,459,900	240,841
1893.....	191,595,530	281,462	1908.....	200,944,800	350,878
1894.....	196,668,730	328,300	1909.....	232,237,700	376,961

\* Salt imported from the United Kingdom, or any British possession, or imported for the use of the sea or gulf fisheries.

† Nine months only.

The exports of salt are comparatively small, but the imports exceed the domestic production both in quantity and value. The consumption of salt in Canada in 1909, as showing in the following table, was approximately 215,844 tons, valued at \$873,352, of which 39 per cent in quantity was of domestic origin and 61 per cent imported:—

**Consumption of Salt in Canada in 1909.**

	Lbs.	Value.
		\$
Canadian salt production in 1909. . . . .	168,074,000	415,219
Less exports . . . . .	276,765	2,488
	167,797,235	412,731
Imports of salt paying duty. . . . .	31,653,900	83,660
" " free of duty. . . . .	232,237,700	376,961
	431,688,835	873,352

All the salt imported from Great Britain enters Canada free of duty. From other countries, only salt imported for the express use of sea or gulf fisheries enters free of duty.

## MISCELLANEOUS NON-METALLIC.

### ARSENIC.

The principal source of arsenic production in Canada at the present time is furnished by the silver-cobalt-nickel-arsenic ores of the Cobalt district.

There was formerly a considerable production of white arsenic from the mispickel ores of Deloro, but the operation on these ores ceased altogether in 1903.

Although the ore shipped from the Cobalt district contains important quantities of arsenic, practically nothing is now paid to the mine owners for the mineral by the purchasing companies. Considerable quantities of these ores are, however, being treated in Canadian metallurgical works, in which white arsenic is being recovered in addition to silver, cobalt oxide, etc. There are three of these plants, one at Copper Cliff, operated by the Canadian Copper Company, a second at Thorold, Ont., operated by the Coniagas Reduction Company, and a third at Deloro, operated by the Deloro Mining and Reduction Company.

The quantity of these ores thus treated in Canada in 1906 was 998 tons, from which there was recovered 201 tons of white arsenic valued at \$14,058. In 1907, 2,266 tons of ore were treated, with a recovery of 330 tons of arsenic. In 1908, the recovery was 915½ tons from 7,182 tons of ore treated, and in 1909 there were 8,384 tons of ore treated, with a recovery of 1,129 tons of arsenic valued at \$64,100. The Ontario Bureau of Mines has estimated the total arsenical content of the Cobalt district ores shipped since 1904 as follows:—

**Arsenical Content of Cobalt District Ores Shipped.**

	Ore Shipped.	Total Arsenic contained.	Per cent in ore.
	Tons.	Tons.	
1904.....	158	72	45·6
1905.....	2,144	549	25·6
1906.....	5,335	1,440	27·0
1907.....	14,788	2,958	20·0
1908.....	25,624	3,672	14·3
1909 ...	30,677	4,294	14·0

During the past three years, arsenical concentrates have been shipped from the gold mine at Goldboro, Nova Scotia, now operated by the New England Mining Company. The arsenical concentrate is produced from the residue of the mill concentrates after the gold has been extracted by bromo-cyanide. The tailings, as discharged from the cyanide vats, carry about 40 per cent silica. These



are reconcentrated to eliminate the silica, and brought down to a clean mispickel concentrate carrying from 38 per cent to 41 per cent metallic arsenic. It is dried and shipped in sacks, most of it going to Swansea, and some to Belgium.

During 1909 there were shipped to Swansea 200 tons (of 2,000 pounds) which averaged 31.18 per cent in arsenic.

In the following tables the production of arsenical ore and white arsenic, and the imports and exports of arsenic are shown:—

### Annual Production of Arsenic.

Calendar Year.	ARSENIC IN ORE.		WHITE ARSENIC.	
	Tons.	Value.	Tons.	Value.
1885.....			440	\$ 17,600
1886.....			120	5,460
1887.....			30	1,200
1888.....			30	1,200
1889.....			Nil.	Nil.
1890.....			25	1,500
1891.....			20	1,000
1892-3.....			Nil.	Nil.
1894.....			7	420
1895-8.....			Nil.	Nil.
1899.....			57	4,872
1900.....			303	22,725
1901.....			695	41,676
1902.....			800	48,000
1903.....			257	15,420
1904-5.....				
1906.....			201	14,058
1907.....	656	\$11,094	330	36,209
1908.....	986	17,506	715½	41,060
1909.....	224	3,346	1,129	64,100

### Exports of White Arsenic.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value
1902.....	547,698	\$ 16,192	1906.....	271,063	\$ 5,981
1903.....	395,573	10,583	1907.....	613,504	10,850
1904.....	146,000	6,900	1908.....	1,913,732	43,493
1905.....	108,000	5,400	1909.....	3,111,249	119,673

## Annual Imports of Arsenic, 1880-1906.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$			\$
1880.....	18,197	576	1889.....	69,269	2,434	1898.....	291,967	14,270
1881.....	31,417	1,070	1890.....	138,509	4,474	1899.....	582,383	24,203
1882.....	138,920	3,962	1891.....	115,248	4,027	1900.....	230,730	11,035
1883.....	51,953	1,812	1892.....	302,958	9,365	1901.....	159,263	8,361
1884.....	19,337	773	1893.....	447,079	12,907	1902.....	106,857	6,004
1885.....	49,080	1,566	1894.....	292,505	10,018	1903.....	298,375	11,824
1886.....	30,181	961	1895.....	1,115,697	31,932	1904.....	414,065	12,421
1887.....	32,436	1,116	1896.....	664,854	27,523	1905.....	268,274	7,661
1888.....	27,510	1,016	1897.....	152,275	8,378	1906 Dutyfree	446,975	19,169

## Imports of Arsenious Oxide and Sulphide of Arsenic.

Fiscal Year.		Lbs.	Value.
			\$
1907 (9 months).....	Arsenious oxide. ....	252,473	16,011
	Arsenic, Sulphide of.....	95,843	6,116
			22,127
1908.. . . . .	Arsenious oxide.....	378,174	26,804
	Arsenic, Sulphide of.....	125,322	7,531
			34,335
1909.....	Arsenious oxide.....	128,612	4,064
	Arsenic, Sulphide of.....	389,815	14,575
			18,639

## CALCIUM CARBIDE.

Three firms are engaged in the manufacture of this product in Canada, viz. :—

The Shawenegan Carbide Company, Shawenegan Falls, Que.

The Ottawa Carbide Company, Limited, Ottawa, Ont.

The Wilson Carbide Company, Limited, Merritton, Ont.

The production of calcium carbide in the Province of Ontario has been ascertained by the Ontario Bureau of Mines for a number of years, and the record is as follows :—

## Calcium Carbide Production in Ontario.

Calendar Year.	Tons.	Value.	Per ton.	Calendar Year	Tons.	Value.	Per ton.
		\$	\$ cts.			\$	\$ cts.
1900.....	1,005	60,300	60 00	1905.....	2,427	156,755	64 59
1901.....	2,771	168,792	60 91	1906.....	2,626	162,780	61 98
1902.....	1,402	89,420	63 78	1907.....	2,667	173,763	65 15
1903.....	2,507	144,000	57 44	1908.....	2,364	147,150	62 25
1904.....	2,343	152,295	65 00	1909.....	2,349	151,676	64 57

## CHALK AND WHITING.

These materials are not produced in Canada, but statistics of their importation are given to show the market for them in Canada.

### Annual Imports of Chalk and Whiting, 1880-1909.

Fiscal Year.	CHALK (a)	WHITING (b)		Fiscal Year.	CHALK (a)	WHITING (b)	
	Value.	Cwt.	Value.		Value.	Cwt.	Value.
	\$		\$		\$		\$
1880.....	2,117	84,115	26,092	1895.....	7,730	102,751	25,441
1881.....	2,768	47,480	16,637	1896.....	6,467	113,791	27,322
1882.....	2,882	36,270	16,318	1897.....	7,432	102,453	22,541
1883.....	5,067	76,012	29,334	1898.....	9,338	166,293	25,761
1884.....	2,589	76,268	28,230	1899.....	10,461	134,884	34,310
1885.....	8,003	67,441	23,492	1900.....	12,212	127,455	34,575
1886.....	6,583	65,124	25,533	1901.....	11,629	209,868	60,878
1887.....	5,635	47,246	15,191	1902.....	11,337	153,982	42,136
1888.....	5,865	76,619	20,508	1903.....	16,497	139,804	39,867
1889.....	5,336	84,658	22,735	1904.....	19,163	186,919	42,507
1890.....	7,221	96,243	27,471	1905.....	20,896	198,485	51,215
1891.....	8,193	84,679	27,504	1906.....	23,853	160,030	44,876
1892.....	9,558	102,985	26,867	1907 (9 mos)...	17,446	128,018	33,453
1893.....	9,966	88,335	25,563	1908.....	24,122	228,699	63,499
1894.....	11,308	103,633	26,649	1909.....	24,066	150,484	45,314

(a) Chalk prepared. Duty, 20 per cent. (b) Whiting or whitening, gilder's whiting, and Paris white. Duty free.

## FELDSPAR.

The total shipments of feldspar in 1909 were reported as 12,783 tons, valued at \$40,383, of which 97 tons, valued at \$1,719, represented shipments of high grade dental spar from Quebec Province, and 12,686 tons valued at \$38,664, shipments from the district north of Kingston, Ont.

The shipping firms were:—

The Kingston Feldspar and Mining Company, Kingston, Ont.

The Dominion Mining Syndicate (O'Brien and Fowler), Ottawa, Ont.

Practically all the Canadian production is exported, the greater part finding a market with the pottery manufacturers in Trenton, N.J., and East Liverpool, Ohio.

Imports of feldspar into Canada are not separately stated in the Customs Reports, but considerable quantities of ground feldspar are imported for use in the manufacture of pottery, sanitary ware, enamelled ware, etc. The imports are of ground feldspar, which are laid down at points of consumption at from \$10 to \$14 per ton.

The annual imports probably exceed 1,500 tons at least, and may amount to much more. No doubt much of this could be supplied from Canadian sources if the material were suitably prepared for the market.

Statistics of the production and exports of feldspar are shown in the following table:—

### Production and Exports of Feldspar.

Calendar Year.	PRODUCTION.		EXPORTS.	
	Tons.	Value.	Tons.	Value.
		\$		\$
1890.....	700	3,500		
1891.....	685	3,425		
1892.....	175	525		
1893.....	575	4,525	50	500
1894.....	Nil.	Nil.	Nil.	Nil.
1895.....		*2,545		2,545
1896.....	972	*2,583	972	2,583
1897.....	1,400	3,290	3,078	5,637
1898.....	2,500	6,250	1,542	4,396
1899.....	3,000	6,000	1,757	5,126
1900.....	318	1,112	379	1,116
1901.....	5,350	10,700	4,367	10,973
1902.....	7,576	15,152	7,374	13,708
1903.....	13,928	18,966	13,760	23,319
1904.....	11,083	22,166	13,960	29,263
1905.....	11,700	23,400	9,161	27,660
1906.....	16,948	40,890	18,183	60,312
1907.....	12,584	29,819	12,068	37,932
1908.....	7,877	21,099	9,524	34,045
1909.....	12,783	40,383	10,834	35,234

\* Exports.

### FLUORSPAR.

The occurrence of fluorspar has been noted on lot 1, concession IV, of Madoc township, Hastings county, Ont., and some very fine crystals have been obtained from this deposit. In 1905 the deposit was opened by S. Wellington of Madoc, and a shipment of 12 tons made to Port Hope. No further shipments have been reported.

### MAGNESITE.

The occurrence of magnesite in the township of Grenville, Argenteuil county, was recognized about eight years ago. A couple of tons were shipped in 1904 for experimental tests, by Mr. M. B. McAllister of Ottawa, and numerous samples were collected and analysed in the laboratory of the Geological Survey, a complete report on which will be found in the Annual Report of the Geological Survey, Vol. XIII, Part R. In 1907, Mr. T. J. Watters, of Ottawa, acquired the north half of lot 18, range XI, of Grenville, and undertook some prospecting and development. About 120 tons, valued at \$7 per ton, were shipped in 1908, finding a market in Montreal, Pittsburgh, and New York. The property has been taken over by the Canadian Magnesite Company of Montreal, and during 1909, 330 tons, valued at \$2.508, were shipped to Montreal.

## QUARTZ.

Considerable quantities of quartz are used by the smelters of nickel-copper ores. It is also used in the manufacture of ferro-silicon, and ground quartz is used by the manufacturers of sanitary ware and enamelled ware.

The production of 1909 was reported as 56,924 tons, valued at \$71,285. Statistics of the production of quartz, so far as they have been obtained, are shown in the next table.

### Annual Production of Quartz.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1890.....	200	1,000	1899.....	600	1,260
1891-2.....			1900-1905.....		
1893.....	100	500	1906.....	48,376	65,765
1894-5-6.....	10	50	1907.....	56,585	124,148
1897.....			1908.....	44,741	52,830
1898.....	284	570	1909.....	56,924	71,285

### Imports of Silex:—Crystallized Quartz.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$
1880.....	5,252	2,290	1895.....	2,882	1,881
1881.....	3,251	1,659	1896.....	3,289	2,174
1882.....	3,283	1,678	1897.....	2,564	3,415
1883.....	3,543	2,058	1898.....	3,104	2,773
1884.....	3,259	1,709	1899.....	3,951	2,595
1885.....	3,527	1,443	1900.....	4,021	2,876
1886.....	2,520	1,313	1901.....	3,562	2,106
1887.....	14,533	5,073	1902.....	4,388	3,858
1888.....	4,808	2,385	1903.....	3,514	2,762
1889.....	5,130	1,211	1904.....	5,547	4,409
1890.....	1,768	2,617	1905.....	8,931	4,475
1891.....	3,674	1,929	1906.....	7,465	8,347
1892.....	1,429	1,244	1907 (9 mos.).....	11,964	12,969
1893.....	2,447	1,301	1908.....	24,938	19,166
1894.....	2,451	1,521	1909 Duty free.....	6,206	6,909



## TALC.

The production of talc during the past three years has varied from 1,000 to 1,500 tons per annum; a value of about \$3 per ton being placed upon the talc at the mine.

The production in recent years has all been derived from the Henderson talc mine in the township of Madoc, county of Hastings. Formerly the output was exported to United States points and used chiefly in the manufacture of cosmetics. Recently, however, a mill has been erected at Madoc for grinding the crude talc and preparing it for the trade. Most of the finished material is now sold in Canada, and the greater part used in the paper trade.

Statistics of production of soapstone and talc since 1886 are as follows:—

### Annual Production of Soapstone and Talc.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	50	400	1898.....	405	1,000
1887.....	100	800	1899.....	450	1,960
1888.....	140	280	1900.....	1,420	6,365
1889.....	195	1,170	1901.....	259	842
1890.....	917	1,239	1902.....	689	1,804
1891.....	Nil	Nil	1903.....	990	2,739
1892.....	1,374	6,240	1904.....	840	1,875
1893.....	717	1,920	1905.....	500	1,800
1894.....	916	1,640	1906.....	1,234	3,030
1895.....	475	2,138	1907.....	1,534	4,602
1896.....	410	1,230	1908.....	1,016	3,048
1897.....	157	350	1909.....	4,350	10,300

## STRUCTURAL MATERIALS AND CLAY PRODUCTS.

The subjects included under this heading comprise, in the order treated : cement ; clay products of various kinds, such as brick, sewerpipe and tile, pottery etc. ; lime ; sand-lime brick ; sands and gravels ; slate ; and stone for building and other purposes, including granite, marble, limestone, sandstone, etc.

That the year 1909 was one of record activity in the building trades, is evidenced by the greatly increased production of all classes of structural materials ; nor was the increase confined to any particular section of the country, but appears to have been general throughout all the provinces. The value of cement sales in 1909 shows an increase of 44 per cent over 1908 ; clay products show an increase of 43 per cent ; lime, an increase of 58·8 per cent ; and stone production also a very large increase. The total value of the sales of these several classes of products in 1909 was \$16,533,349, as compared with a valuation in 1908 of \$11,339,955 ; showing an apparent increase in production of \$5,193,394, or 45·8 per cent. Part of this increase, however, may possibly be ascribed to a more complete collection of the statistics for 1909, a special effort having been made to increase the efficiency of the returns, particularly as regards the statistics of clay and stone production.

A summary of the production of structural materials and clay products during the past four years is shown below :—

	1906.	1907.	1908.	1909.
	\$	\$	\$	\$
Cement.....	3,170,859	3,781,371	3,709,954	5,345,802
Clay products.....	5,072,635	5,772,117	4,500,702	6,450,840
Lime.....	1,009,177	974,595	712,947	1,132,756
Sand-lime brick.....		167,795	152,856	201,650
Sand and gravels (exports).....	139,712	119,853	161,387	256,166
Slate.....	24,446	20,056	13,496	19,000
Stone.....	2,113,699	2,027,262	2,088,613	3,127,135
Total.....	11,530,528	12,863,049	11,339,955	16,533,349

The structural materials and clay products are a class for which it would be supposed, and not without reason, that Canada possessed practically unlimited supplies of the raw materials. It is, therefore, a matter of some regret, to still find large importations, particularly of clay and stone products.

With respect to cement it may be observed that nine years ago, or in 1901, 64 per cent of the cement consumed in Canada was imported. The growth of the cement industry, however, has been such, that in 1909 the imports of cement

amounted to only 3 per cent of the total consumption, showing the undoubted value of our resources in cement materials and the ability of Canadian cement mills to supply the home demand.

With clay products the conditions are somewhat different. The value of the production in 1900 was estimated at \$3,195,105, which had grown to \$6,450,840 in 1909, an increase of about 102 per cent. During the same period the value of the imports of clay products increased from \$1,228,405 in 1900 to \$3,247,539 in 1909, or an increase of about 152 per cent. In other words, the imports in 1900 constituted about 28 per cent of the total consumption, but the proportion had increased in 1909 to over 33 per cent. Thus Canada's imports of clay goods have apparently during the past ten years been increasing at a more rapid rate than the home production. This situation is no doubt due in large measure to our failure, up to the present, to locate or discover commercially available clays suitable for the manufacture of the better grades of clay products, also, it is probably due in no small measure to a general lack of technical training in methods and processes of clay working.

Limestone is found in abundance in almost every province of the Dominion. Both the exports and imports of lime are comparatively small and the production is consequently limited only by demand for home consumption.

There is a considerable importation of stone both for building and decorative purposes, the annual imports during the past four years having averaged in value somewhat above half a million dollars. Questions of economic expediency, and the personal desires of builders, have no doubt much to do with this, since there can be no doubt of the existence in Canada, in practically limitless quantities, of all kinds of stone of the best quality for either building or decorative purposes.

The development of both the clay and stone industries will proceed much more rapidly as the country grows in population and wealth, and when our resources in these products become better known and understood.

## CEMENT.

Natural rock cement was not made in Canada in 1909, nor were any of the natural rock plants in operation in 1908, though a small quantity was sold during that year from the previous year's manufacture.

This industry, at one time of considerable importance in the Province of Ontario, has gradually given way to the manufacture of Portland cement, the production of which has shown a steady and rapid growth since its inception in 1890 or thereabouts. There is now also one plant at Sydney, N.S., making cement from blast furnace slag, the statistics of production being included with those of Portland cement.

The total value of cement sales in 1909 exceeded five million dollars. Statistics of the total annual sales of natural rock and Portland cement since 1887 are shown in the table following :—

### Annual Production of Cement.\*

Calendar Year.	Natural Rock Cement.		Portland Cement.		Totals.	
	Bls.	Value.	Bls.	Value.	Bls.	Value.
		\$		\$		\$
1887 .....					69,843	81,909
1888 .....					50,668	35,593
1889 .....	90,474	69,790	Nil.	Nil.	90,474	69,790
1890 .....	87,521	74,822	14,695	17,583	102,216	92,405
1891 .....	90,846	103,479	2,633	5,082	93,479	108,561
1892 .....	88,187	94,912	29,221	52,751	117,408	147,663
1893 .....	126,673	130,167	31,924	63,848	158,597	194,015
1894 .....	72,965	74,842	35,177	69,795	108,142	144,637
1895 .....	66,219	60,795	62,075	112,880	128,294	173,675
1896 .....	70,705	60,500	78,385	141,151	149,090	201,651
1897 .....	85,450	65,893	119,763	209,380	205,213	275,273
1898 .....	87,125	73,412	163,084	324,168	250,209	397,580
1899 .....	147,387	119,308	255,366	513,983	396,753	633,291
1900 .....	125,428	99,994	292,124	562,916	417,552	662,910
1901 .....	133,328	94,415	317,066	565,615	450,394	660,030
1902 .....	127,931	98,932	594,594	1,028,618	722,525	1,127,550
1903 .....	92,252	74,655	627,741	1,150,592	719,993	1,225,247
1904 .....	56,814	50,247	910,358	1,287,992	967,172	1,338,239
1905 .....	14,184	10,274	1,346,548	1,913,740	1,360,732	1,924,014
1906 .....	8,610	6,052	2,119,764	3,164,807	2,128,374	3,170,859
1907 .....	5,775	4,043	2,436,903	3,777,328	2,441,868	3,781,371
1908 .....	1,044	815	2,665,289	3,709,139	2,666,333	3,709,954
1909 .....	0	0	4,067,709	5,345,802	4,067,709	5,345,802

\* Quantities sold or shipped.

According to returns received from the manufacturers, the total quantity of Portland cement (including slag cement) made in Canada, 1909, was 4,146,708 barrels of 350 pounds net, as compared with 3,495,961 barrels in 1908 ; an increase of 650,747 barrels, or 18·6 per cent.

The total quantity of Canadian Portland cement sold in 1909 was 4,067,709 barrels, as compared with 2,665,289 barrels in 1908 ; or an increase of 1,402,420 barrels, or 52·6 per cent.

The total consumption of Portland cement in 1909, including Canadian and imported cements, was 4,209,903 barrels (of 350 pounds net), as compared with 3,134,338 barrels in 1908 ; or an increase of 1,075,565 barrels, or 34·3 per cent.

An interesting feature of the cement industry is the rapid decrease in importation of cement, indicating the increasing ability of Canadian plants to supply the home demand. The imports in 1909, which were 142,194 barrels, amounted to only 3 per cent of the total consumption, as compared with 15 per cent in 1908, and 64 per cent in 1901.



Detailed statistical returns respecting the stock on hand at the beginning and end of the year, the total value and price per barrel, the number of men employed and wages paid, the quantity and value of the imports etc. for the years 1908 and 1909 are shown in comparative form in the following table :—

**Comparison of Production, Sales, and Imports of Portland Cement in 1908 and 1909.**

	1908.	1909.	Increase.	%	Decrease.	%
Cement sold..... Bls.	2,665,289	4,067,709	1,402,420	52.6		
Cement manufactured..... "	3,495,961	4,146,708	650,747	18.6		
Stock on hand, Jan. 1..... "	383,349	1,098,239	714,890	186.5		
" " Dec. 31..... "	1,214,021	1,177,238			36,783	3.0
Value of cement sold..... \$	3,709,139	5,345,802	1,636,663	44.1		
Average price per bl..... \$	1.39	1.31			0.08	5.6
Wages paid..... \$	1,275,638	1,266,128			9,510	7.5
Men employed..... No.	3,029	2,498			531	17.5
Imports of Portland cement..Bls.	469,049	142,194			326,855	69.7
Value of cement..... \$	531,045	166,669			364,376	68.6
Average price per bl..... \$	1.13	1.17	0.04	3.5		
Total consumption of cement in Canada..... Bls.	3,134,338	4,209,903	1,075,565	34.3		
No. of completed plants operated...	23	22			1	4.3
Total daily capacity of operating plants as at Dec. 31. ....Bls.	27,500	23,050			4,450	16.2

\* The Canada Cement Company have made a somewhat more conservative estimate of the capacities of their several plants than was made by the previous operators.

The production of Portland cement in 1909 was derived from 22 operating plants with a total daily capacity of 23,050 barrels, equivalent to about 6,915,000 barrels per year of 300 operating days. This capacity is about 50 per cent in excess of the present rate of consumption. It will be observed, however, that the consumption in 1909 showed an increase of 34 per cent over that of 1908, and should a similar rate of increase be maintained during the next two years, it would require a fairly steady operation of present plants to supply demand. The operating plants were distributed as follows: one in Nova Scotia, using blast furnace slag; one in Manitoba, making a natural Portland cement; one in British Columbia, two in Alberta, and three in Quebec using limestone and clay; and fourteen in Ontario, of which, eleven used marl and three limestone. The mills of the Imperial Cement Company, Ltd., Owen Sound, and the Colonial Portland



Cement Co., Wiarton, were idle throughout the year, the former Company's affairs having been placed in the hands of an assignee, and the latter undergoing reorganization, the new Company to be known as The Crown Portland Cement Company, Ltd. Both of these Companies used marl. The total daily capacity of the plants using marl was 7,350 barrels, as compared with 15,700 barrels per day for all other plants. The two marl plants not operated are equipped for a daily capacity of 1,100 barrels. Of the total quantity of cement made in 1909, 810,706 barrels were made from marl and 3,336,002 barrels from limestone and slag. In 1908 there were 1,573,090 barrels made from marl and 1,922,871 barrels from limestone and slag.

It is not possible to give the *detailed* statistics of production in each of the provinces separately, as returned to the Department, without divulging confidential returns. The production in Ontario may be separately stated, however, and that of the other provinces grouped in one statement as follows:—

#### Cement Production in Ontario, 1908 and 1909.

		1908.	1909.	Increase.	%	Decrease.	%
Cement sold .....	Bls.	1,518,886	2,462,027	943,141	62.1		
Cement manufactured .....	"	2,016,737	2,283,263	266,526	13.2		
Stock on hand, Jan. 1 .....	"	314,579	765,873	451,294	143.5		
Stock on hand, Dec. 31 .....	"	812,430	587,109			225,321	27.7
Value of cement sold .....	\$	1,909,815	3,084,218	1,174,403	61.5		
Wages paid .....	\$	636,955	606,639			30,316	4.8
Men employed .....	No.	1,619	1,340			279	17.2
Total daily capacity of operating plants .....	Bls.	14,900	12,450			2,450	16.4

#### Cement Production in other Provinces, 1908 and 1909.

		1908.	1909.	Increase.	%	Decrease.	%
Cement sold .....	Bls.	1,066,403	1,605,682	539,279	50.6		
Cement manufactured .....	"	1,479,224	1,863,445	384,221	26.0		
Stock on hand, Jan. 1 .....	"	68,770	332,366	263,596	383.3		
Stock on hand, Dec. 31 .....	"	401,591	590,129	188,538	46.9		
Value of cement sold .....	\$	1,799,324	2,261,584	462,260	25.7		
Wages paid .....	\$	638,683	659,489	22,806	3.6		
Men employed .....	No.	1,410	1,158			252	17.9
Total daily capacity of operating plants .....	Bls.	12,600	10,000			2,600	20.6

Statistics of the annual production of Portland cement for a number of years showing the quantity made, the quantity sold, stocks on hand at the end of the year, value of sales, etc., are shown in the next table :—

### Annual Production of Portland Cement.

Year.	Quantity Made.	Quantity Sold.	On hand Dec. 31.	Value of Sales.	Average per barrel.	Daily Capacity.
	Bls.	Bls.	Bls.	\$	\$ cts.	Bls.
1897.....		119,763		209,380	1 75	
1898.....		163,084		324,168	1 99	
1899.....		253,366		513,983	2 01	
1900.....		292,124		562,916	1 91	
1901.....	360,160	317,066	58,094	565,615	1 78	
1902.....	562,335	594,594	33,446	1,028,618	1 73	3,900
1903.....	714,136	627,741	128,386	1,150,592	1 83	4,850
1904.....	908,990	910,358	112,051	1,287,992	1 41	
1905.....	1,541,568	1,346,548	306,466	1,913,740	1 42	8,000
1906.....	2,152,562	2,119,764	302,356	3,164,807	1 49	10,500
1907.....	2,491,513	2,436,093	354,435	3,777,328	1 55	14,400
1908.....	3,495,961	2,665,289	1,214,021	3,709,139	1 39	27,500
1909.....	4,146,708	4,067,709	1,777,238	5,345,802	1 31	23,050

*Prices* :—Manufacturers' prices of cement in car lots, cost of package excluded, as quoted by the Canadian Cement and Concrete Review, were as follows :—

*Toronto* :—During the first three months of the year, prices ranged from \$1.55 to \$1.75 per barrel ; from April to December, the range was from \$1.30 to \$1.65.

*Montreal* :—Quotations during the first three months, \$1.65 to \$1.75 ; April to December, \$1.35 to \$1.65.

*Winnipeg* :—Quotations throughout the year, \$2.25 to 2.40 per barrel.

*Imports and Exports* :—There has been very little cement exported from Canada during past years, the value of the exports in 1907 being \$9,618 ; this was increased in 1908 to a value of \$34,591, and a further increase in 1909 is recorded, the exports being valued at \$113,362. The quantity exported is not shown in the Customs Reports.

The imports of Portland cement, which, previous to 1904, were larger than the Canadian production, have been decreasing since 1906, and amounted in 1909 to only 142,194 barrels, or about 3 per cent of the consumption ; as compared with imports of 469,049 barrels, or 15 per cent of the consumption in 1908. A duty of  $12\frac{1}{2}$  cents per 100 pounds, equivalent to  $43\frac{3}{4}$  cents per barrel of 350 pounds net, is levied on imports. The weight of the package is, however, included for purposes of duty.

During 1907 and 1908 the greater part of the cement imported was from the United States, over 53 per cent of the imports being from that source during the latter year. During 1909, however, over 64 per cent of the imports was derived from Great Britain and less than 30 per cent from the United States.

The imports of cement during 1908 and 1909 by countries were as follows :—

	1908.			1909.		
	Cwt.	%	Value.	Cwt.	%	Value.
			\$			\$
Great Britain.....	601,527	36·6	202,139	322,149	64·7	104,060
United States.....	902,576	55·0	283,899	145,962	29·3	51,222
Belgium.....	128,738	7·8	40,856	15,761	3·2	5,029
Other countries.....	8,831	0·5	4,151	13,806	2·8	6,358
Totals.....	1,641,672	99·9	531,045	497,678	100·0	166,669
Equivalent in barrels .....	469,049	.....	.....	142,194	.....	.....

Statistics of the export of cement since 1891 and of the imports since 1880 are given in the next two tables :—

#### Exports of Cement.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1891.....	2,881	1898.....	2,117	1904.....	5,494
1892.....	938	1899.....	2,733	1905.....	3,143
1893.....	1,172	1900.....	3,296	1906.....	7,551
1894.....	482	1901.....	1,514	1907.....	9,618
1895.....	937	1902.....	2,267	1908.....	34,591
1896.....	1,328	1903.....	2,851	1909.....	113,362
1897.....	644				

## Imports of Cement into Canada.

Fiscal Year.	Cement and Mfrs. of, N. E. S.	Hydraulic Cement.		Portland Cement.	
		Bls.	Value.	Bls.	Value.
	\$		\$		\$
1880 .....	28	10,034	10,306	.....	55,774
1881 .....	298	7,812	7,821	.....	45,646
1882 .....	86	11,945	13,410	.....	66,579
1883 .....	548	11,659	13,755	.....	102,537
1884 .....	1,236	8,606	9,514	.....	102,857
1885 .....	1,315	5,613	5,396	.....	111,521
1886 .....	1,851	6,164	6,028	.....	120,398
1887 .....	1,419	6,160	8,784	102,750	148,054
1888 .....	5,787	5,636	7,522	122,462	177,158
1889 .....	10,668	5,835	7,467	122,273	179,406
1890 .....	5,443	5,440	9,048	192,322	313,572
1891 .....	2,890	3,515	6,152	183,728	304,648
1892 .....	3,394	2,214	2,782	187,233	281,553
1893 .....	2,909	4,596	8,060	229,492	316,179
1894 .....	2,618	1,054	985	224,150	280,841
1895 .....	2,112	5,333	7,001	196,281	242,813
1896 .....	3,672	5,688	8,948	204,407	242,409
1897 .....	4,318	2,494	3,937	210,871	252,587
		Cwt.		Cwt.	
1898 .....	3,263	16,033	7,097	1,073,058	355,264
1899 .....	8,929	1,678	694	1,300,424	467,994
1900 .....	10,452	10,418	4,711	1,301,331	498,607
1901 .....	4,890	17,784	6,865	1,612,432	654,595
1902 .....	12,234	29,585	17,755	1,971,616	833,657
1903 .....	16,281	13,690	6,323	2,316,853	868,131
1904 .....	14,305	12,088	5,391	2,476,388	995,017
1905 .....	18,489	16,961	10,690	4,228,394	1,234,649
1906 .....	27,858	10,794	4,034	2,848,582	963,839
1907 (9 mos.) .....	16,201	1,192	685	1,551,493	523,120
1908 .....	12,418	18,860	6,710	2,427,381	852,041
1909 .....	5,733	438	466	1,460,850	475,676

\* Cement not elsewhere specified and manufactures of cement.

*Consumption of Cement.*—Although the exports of cement have been increasing during the past two years, the value is still comparatively small, and as the quantity has not been recorded, the consumption has been estimated on the basis of the Canadian production and the imports.

The total consumption of Portland cement in Canada in 1909 was 4,209,903 barrels (736,733 tons): made up of 4,067,709 barrels (711,849 tons) of Canadian cement, or 97 per cent; and 142,194 barrels (24,884 tons) of imported cement, or 3 per cent.

In 1908, the total consumption was 3,134,338 barrels (548,509 tons), of which 85 per cent was made in Canada, and 15 per cent imported.

In 1901, the total consumption was 872,966 barrels (152,769 tons), of which only 36 per cent was made in Canada, and 64 per cent was imported.

Following is an estimate of the consumption of Portland cement in Canada during the past nine years :—

### Annual Consumption of Portland Cement.

Calendar Year.	Canadian.		Imported.		Total.
	Bls.	%	Bls.	%	Bls.
1901.....	317,066	36	555,900	64	872,966
1902.....	594,594	52	544,954	48	1,139,548
1903.....	627,741	45	773,678	55	1,401,419
1904.....	910,358	54	784,630	46	1,694,988
1905.....	1,346,548	59	918,701	41	2,265,249
1906.....	2,119,764	76	665,845	24	2,785,609
1907.....	2,436,093	78	672,630	22	3,108,723
1908.....	2,665,289	85	469,049	15	3,134,338
1909.....	4,067,709	97	142,194	3	4,209,903

### Quebec.

The Superintendent of Mines for the Province publishes the production of cement in 1909 as 1,011,194 barrels, valued at \$1,314,551 ; as compared with a production of 801,695 barrels, valued at \$1,127,335, in 1908. All the operating plants in this Province have been acquired by the Canada Cement Company.

### Ontario.

Statistics of cement production in Ontario have already been given in detail in tabular form, the total sales for 1909 being 2,462,027 barrels, valued at \$3,084,218. There were 14 plants in operation during 1909, of which six controlled by the Canada Cement Company produced the greater part of the cement sold.

### Alberta.

There are two operating cement plants in this Province : one at Calgary, now owned by the Canada Cement Company, and a plant at Exshaw owned by the Western Canada Cement and Coal Company. A third plant was under construction at Blairmore by the Rocky Mountain Cement Company, with a proposed capacity of 500 barrels per day.

### British Columbia.

There is but one cement plant in this Province, viz., that located at Tod inlet, twelve miles from Victoria, and operated by the Vancouver Portland Cement Co. The capacity of the plant is about 1,000 barrels a day, and during 1909 the Company made about 238,000 barrels of cement.



A feature of special interest in connexion with the cement industry in 1909 was the consolidation of ten plants, incorporated as the Canada Cement Company, Ltd. The following companies entered the consolidation :—

The Vulcan Portland Cement Co., Ltd.,	Longue Point, Que.
The Lakefield	" " Pointe aux Trembles, Que.
The International	" " Hull, Que.
The Owen Sound	" " Shallow Lake, Ont.
The Belleville	" " Belleville, Ont.
The Lehigh	" " "
Lakefield	" " Lakefield, Ont.
The Canadian	" " Marlbank and Port Colborne, Ont.
The Alberta Portland Cement Co.,	Calgary, Alta.

Following is a list of cement manufacturing companies :—

Name.	Location of Plant.	Head Office.
Sydney Cement Company, Ltd.	Sydney, N.S.	Sydney, N.S.
Canada Cement Company, Ltd.		Montreal, Que.
Montreal Mill No. 1.	Longue Point, Que.	
" " No. 2.	Kilbourn Siding, Que.	
International Mill	Hull, Que.	
Owen Sound	Shallow Lake, Ont.	
Belleville	Belleville, Ont.	
Lehigh	" "	
Lakefield	Lakefield, Ont.	
Marlbank	Marlbank, Ont.	
Port Colborne	Port Colborne, Ont.	
Alberta	Calgary, Alta.	
Grey and Bruce Portland Cement Co.	Owen Sound, Ont.	Owen Sound, Ont.
The Sun Portland Cement Co., Ltd. (In liquidation).	" "	" "
The Imperial	" "	" "
Hanover	Hanover, Ont.	Hanover, Ont.
The Ontario	Blue Lake, Ont.	Brantford, Ont.
The National	Durham, Ont.	Durham, Ont.
Kirkfield	Raven lake, Ont.	Toronto, Ont.
Superior	Orangeville, Ont.	Orangeville, Ont.
The Maple Leaf	Atwood, Ont.	Listowel, Ont.
The Crown	" "	Warton, Ont.
The Commercial Cement Co., Ltd.	Babcock, Man.	Winnipeg, Man.
The Western Canada Cement & Coal Co.	Exshaw, Alta.	Ottawa, Ont.
Vancouver Portland Cement Co.	Tod inlet, B.C.	Victoria, B.C.

Following is a list of companies building, or contemplating the erection of mills :—

Ben Allan Portland Cement Co.	Owen Sound, Ont.
Lake Medal	Hamilton, Ont.
Bell's Lake	Markdale, Ont.
The Brant	Brantford, Ont.
The Rocky Mountain Cement Co.	Blairmore, Alta.
Canada Cement Co., (Quebec Mill)	Montreal, Que.

## CLAY PRODUCTS.

The clay products made in Canada comprise brick of various kinds, including common and pressed brick, paving, ornamental, and fancy brick, firebrick, porous fireproofing brick and blocks, sewerpipe, drain tile, pottery and sanitary ware.

There are a large number of manufacturers of brick whose individual output is comparatively small, and in past years it has been somewhat difficult to obtain complete returns of production. Our circular inquiry for 1909 was supplemented by a personal canvas in the Province of Ontario, with very satisfactory results, there being an evident willingness on the part of practically all producers to make the statistics as complete as possible.

The prompt co-operation of all clay manufacturers in furnishing returns of production would enable the Department to publish the statistics much earlier than has hitherto been possible.

The statistics of production given herewith represent actual sales ; material produced but held in stock over the end of the year, not being included until disposed of.

According to the returns received the total value of the clay products sold in 1909 was \$6,450,840, as compared with a total valuation in 1908 of \$4,500,702 ; an increase of \$1,950,138, or 43.3 per cent. The total value of the clay products sold in 1907 was \$5,772,117; in 1906 it was \$5,072,635, and in 1905, \$4,709,842.

Of the total value of the clay production in 1909, about 76 per cent was made up of building and paving brick, and about 16 per cent of sewerpipe and tile.

The production by classes is shown as follows :—

### Production of Clay Products, 1908 and 1909.

	1908.			1909.		
	Quantity.	Value.	Per M	Quantity.	Value.	Per M
		\$	\$ cts.		\$	\$ cts.
Bricks—						
Common..... No.	353,261,268	2,611,554	7 39	539,228,708	4,212,424	7 81
Pressed..... "	53,480,764	517,180	9 67	57,264,656	630,677	11 01
Paving..... "	3,719,961	59,456	15 98	3,759,803	67,408	17 93
Ornamental.....		18,535			8,866	
Firebrick, and fireclay shapes, etc.		110,302			78,132	
Fireproofing, and architectural terra-cotta, etc.		170,211			113,866	
Pottery.....		200,541			285,285	
Sewerpipe.....		514,362			645,722	
Tiles, drain.....	29,100,261	298,561	14 85	27,571,097	408,440	14 81
Totals.....		4,500,702			6,450,840	

## Production of Clay Products, 1907.

		1907.		
		Quantity.	Value.	Per M
			\$	\$ cts.
Bricks—				
Common.....	No.	439,015,550	3,455,524	7 87
Pressed.....	"	78,922,092	794,722	10 07
Paving.....	"	3,617,720	72,354	20 00
Ornamental.....			47,288	
Firebrick and fireclay shapes, etc.....			131,322	
Fireproofing and architectural terra-cotta, etc.....			89,389	
Pottary.....			253,809	
Sewerpipe.....			667,100	
Tiles, drain.....			260,609	
Total.....			5,772,117	

By provinces the production during the past four years has been as follows:—

## Production of Clay Products by Provinces, 1906-9.

Province.	1906.	1907.	1908.	1909.
	\$	\$	\$	\$
Nova Scotia.....	160,506	125,560	117,833	188,185
New Brunswick.....	49,220	57,377	75,513	65,570
Quebec.....	769,458	1,214,108	893,717	1,153,832
Ontario.....	3,136,870	3,123,372	2,476,152	3,425,841
Manitoba.....	517,065	466,432	265,091	559,008
Saskatchewan.....	136,022	125,459	87,566	145,516
Alberta.....	180,217	353,672	240,384	442,486
British Columbia.....	123,277	306,137	344,446	470,402
	5,072,635	5,772,117	4,500,702	6,450,840

## Annual Value of Production of Clay Products, 1899-1909.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1899	2,988,099	1903	1,034,289	1907	5,772,117
1900	3,195,105	1904	3,841,560	1908	4,500,702
1901	3,382,706	1905	4,709,842	1909	6,450,840
1902	3,625,489	1906	5,072,635		

Important as are Canada's clay industries, the output is far from sufficient to supply the home demand. The exports are almost negligible, the only item recorded being that of building brick, of which the exports in 1909 were 365,000,

valued at \$2,255, as compared with 2,344,000 in 1908, valued at \$9,047. The imports of clay and clay products on the other hand are very considerable, amounting in value during the calendar year 1909, to \$3,247,539. These imports include chiefly manufactured products, such as brick, tile, earthenware and china of all kinds. There is also, however, quite a large importation of clays, such as the better grades of china-clay, fireclay etc. The imports of brick and tile were valued at \$1,249,450. Earthenware and china were imported to a value of \$1,781,759, and clays to a value of \$216,330.

Statistics of the imports of clay products during the fiscal years 1908 and 1909, and the calendar year 1909, are shown hereunder.

### Imports of Clay Products, 1908 and 1909.

Imports.	12 months ending March, 1908.	12 months ending March, 1909.	12 months ending Decem- ber, 1909.
	\$	\$	\$
Brick and tiles—			
Bath brick .....	1,834	4,432	1,495
Building brick .....	139,105	108,773	195,360
Paving brick .....	61,346	101,187	139,366
Firebrick of a kind not made in Canada .....	639,347	350,457	485,994
Drain tile, not glazed .....	2,080	2,394	2,785
Drain pipe, sewerpipe, etc .....	125,747	106,399	170,280
Mfgs. of clay, N.O.P .....	110,097	141,391	254,170
	1,079,556	815,033	1,249,450
Earthenware and chinaware—			
Brown coloured .....	22,847	28,273	36,673
Demijohns, churns, and crocks .....	17,836	10,571	8,888
Tableware of china, porcelain, white granite .....	1,555,517	1,202,537	1,212,365
China and porcelain .....	109,446	87,798	87,467
Tiles or blocks of .....	45,836	43,299	56,974
Earthenware tiles, N.O.P .....	116,480	79,854	81,393
Mfgs. of earthenware, N.O.P .....	83,309	66,932	78,063
Earthenware, N.O.P .....	239,513	197,623	219,936
	2,190,784	1,716,887	1,781,759
Clays—			
China-clay .....	97,236	90,922	100,066
Fireclay .....	155,873	77,146	86,161
Pipe-clay .....	319	887	310
Clays, all other, N.O.P .....	14,292	21,280	29,793
	267,720	190,235	216,330
Grand total .....	3,538,060	2,722,155	3,247,539

In addition to the above imports, there is also a considerable annual importation of "chalk, china or Cornwall stone, cliff stone and feldspar, fluorspar, magnesite, ground or unground," much of which is no doubt used in connexion with the manufacture of clay products. The value of these imports during the fiscal year ending March, 1909, was \$81,675; of which \$55,909 worth was from the United States and \$25,233 from Great Britain. The value of the imports under this item during the calendar year 1909 was \$96,747. There is also an

annual importation of "baths, bath tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material," \$157,881 worth during the fiscal year 1909; much of which would possibly come under the class of clay products known as sanitary ware.

The principal sources of the imports given in the above table for the fiscal year ending March, 1909, are shown in the next table. It will be observed that of the total, the largest proportion, \$1,397,845 in value or over 51 per cent, was from Great Britain. The value of the imports from the United States was \$887,400, or 32 per cent of the total; Germany supplied \$187,381 worth, or about 7 per cent; France, Austria-Hungary, and Japan were also important sources of clay products, particularly of the manufactures of table ware, chinaware, etc.



## Imports of Clay Products during the twelve months ending March, 1909, showing countries of origin.

Imports.	Great Britain.	United States.	Germany.	France.	Austria-Hungary.	Japan.	Other Countries.	Total.
	\$	\$	\$	\$	\$	\$	\$	\$
Brick and tiles—								
Bath brick.....	1,422	3,010						4,432
Building brick.....	20,493	88,260					20	108,773
Paving brick.....	75,497	25,468		222				101,187
Firebrick, of a class or kind not made in Canada.....	54,278	295,879	291	9				350,457
Drain tile, not glazed.....	351	2,043						2,394
Drain pipe, sewerpipe and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed.....	47,206	59,162						
Manufactures of clay, N.O.P.....	52,759	88,444	142	46			31	106,399
Total.....	252,006	562,236	433	277			30	141,391
							81	815,033
Earthenware and chinaware—								
Brown or coloured earthen and stoneware, and Rockingham ware.....	9,591	17,922	234	20	245	218	43	28,273
C.C. or cream coloured ware, decorated, printed or sponged, and all earthenware, N.O.P.	125,069	37,805	7,046	1,630	2,016	21,150	2,907	197,623
Demijohns, churns or crocks.....	1,993	8,385			61	94	38	10,571
Tableware of china, porcelain, white granite or ironstone.....	832,307	29,963	160,281	93,082	57,904	26,152	2,848	1,202,537
China and porcelain ware, N.O.P.....	25,606	13,357	15,660	5,786	9,006	16,526	1,857	87,798
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....	10,663	31,270		1,167			199	43,299
Earthenware tiles, N.O.P.....	39,234						8	79,854
Manufactures of earthenware, N.O.P.....	20,102	38,646	1,970	2,991	1,073	1,899	251	66,932
Total.....	1,065,943	216,582	185,191	104,676	70,305	66,039	8,151	1,716,887

Imports of Clay Products during the twelve months ending March, 1909, showing countries of origin—*Continued.*

Imports.	Great Britain.	United States.	Germany.	France.	Austria-Hungary.	Japan.	Other Countries.	Total.
	\$	\$	\$	\$	\$	\$	\$	\$
Clays—								
China clay, ground or unground.....	59,795	30,092	1,035	.....	.....	.....	.....	90,922
Fireclay, ground or unground.....	18,492	58,483	171	.....	.....	.....	.....	77,146
Pipe-clay, ground or unground.....	308	28	551	.....	.....	.....	.....	887
Clays, all other, N.O.P.....	1,301	19,979	.....	.....	.....	.....	.....	21,280
Total.....	79,896	108,582	1,757	.....	.....	.....	.....	190,235
Grand Total.....	1,397,845	887,400	187,381	104,953	70,305	66,039	8,232	2,722,155
Per cent of total.....	51.35	32.60	6.88	3.86	2.58	2.43	0.30	100.00
Baths, bath-tubs, basins, closets, lavatories, urinals, sinks and laundry-tubs of any material.....	25,832	132,024	.....	.....	21	4	.....	137,881
Chalk, china or Cornwall stone, cliff stone, and feldspar, flint, magnesite, ground or unground.....	25,233	55,909	325	181	.....	.....	27	81,675

A record of the total annual value of the imports of clay products since 1900 is shown in the next table. In ten years Canada has imported clay products to the value of over \$22,000,000. The increase over the ten year period was about 122 per cent. Brick and tile imports in the ten years have increased 458 per cent, earthenware and chinaware over 78 per cent, and clays over 54 per cent.

These statistics indicate in a striking manner the possibilities for the development of Canada's clay industries.

#### Imports of Clay Products (total value) 1900-9.

Fiscal Year.	Brick and Tile.	Earthenware and Chinaware	Clays.	Total.
	\$	\$	\$	\$
1900 .....	145,914	959,526	122,965	1,228,405
1901 .....	133,343	1,114,677	141,251	1,389,271
1902 .....	172,281	1,275,093	140,521	1,587,895
1903 .....	157,783	1,406,610	176,416	1,740,809
1904 .....	259,421	1,611,356	144,706	2,015,483
1905 .....	761,756 **	1,636,214	176,805	2,574,775
1906 .....	1,000,372	1,692,359	220,504	2,913,235
1907* .....	770,686	1,422,880	178,240	2,371,806
1908 .....	1,079,556	2,190,784	267,720	3,538,060
1909 .....	815,033	1,716,887	190,235	2,722,155
	5,296,145	15,026,386	1,759,363	22,081,894

\* 9 months ending March 1907.

\*\* Includes fireclay classified as "for use in process of manufactures."

In view of the large imports of clay products into Canada, it may be of interest to quote herewith the Customs duties affecting these goods. Canadian pottery manufacturers claim to be unable to meet the competition of imported pottery, particularly that from England. The total duties collected on clay products during the fiscal year 1909 were \$490,294.80, or an average of about  $22\frac{1}{2}$  per cent *ad valorem*, on the dutiable imports, or 18 per cent on the total imports of clay goods, including those entered free.

## Canadian Customs Duties on Clay Products.

(From the Customs Tariff, 1907, revised 1910).

Item.		British Preferential Tariff.	Inter- mediate Tariff.	General Tariff.
281	Firebrick of a class or kind not made in Canada.....	Free.	Free.	Free.
282	Building brick, paving brick, and mfgs. of clay or cement (N.O.P.).....	12½ %	20 %	22½ %
283	Drain tiles not glazed.....	15 "	17½ "	20 "
284	Drain pipes, sewerpipes, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed, earthen- ware tiles (N.O.P.).....	25 "	32½ "	35 "
285	Tiles or blocks of earthenware or of stone prepared for mosaic flooring.....	20 "	27½ "	30 "
286	Earthenware and stoneware, viz., demijohns, churns or crocks.....	20 "	27½ "	30 "
287	Tableware of china, porcelain, white granite or iron- stone.....	15 "	27½ "	27½ "
288	Earthenware and stoneware, brown or coloured, and Rockingham ware "C.C." or cream coloured ware, decorated, printed or sponged, and all earthenware, (N.O.P.).....	20 "	27½ "	30 "
289	Closets, urinals, basins, lavatories, baths, bath tubs, sinks, and laundry tubs of earthenware, stone, cement or clay or of other material.....	20 "	30 "	35 "
295	Clays, including china-clays, fireclay and pipe-clay, not further manufactured than ground; ganister and sand; gravels; earths, crude only. ....	Free.	Free.	Free.

*Clay Building Brick*:— The total production of clay building brick, including the common and pressed varieties, but excluding ornamental, paving and firebrick is shown by provinces for the years 1907, 1908, and 1909 in the next table.

In 1907, the total production was 517,937,648, valued at \$4,250,246 : made up of 439,015,556 common, valued at \$3,455,524, or an average value per thousand of \$7.87 ; and 78,922,092 pressed brick, valued at \$794,722, or an average value per thousand of \$10.07.

In 1908, the total production was 406,742,030, valued at \$3,128,734 : made up of 353,261,268 common, valued at \$2,611,554, or an average value per thousand of \$7.39 ; and 53,480,764 pressed brick, valued at \$517,180, or an average value per thousand of \$9.67.

In 1909, the total production was 596,493,364, valued at \$4,843,101 : made up of 539,228,708 common, valued at \$4,212,424, or an average value per thousand of \$7.81 ; and 57,264,656 pressed brick, valued at \$630,677, or an average value per thousand of \$11.01.

## Production of Clay Building Brick (Common and Pressed) 1907, 1908, and 1909.

	1907.		1908.		1909.	
		\$		\$		\$
Nova Scotia.....	19,646,000	110,338	9,125,000	56,064	18,875,000	114,795
New Brunswick...	4,941,141	36,937	6,594,011	54,573	6,170,000	44,330
Quebec.....	104,394,709	715,922	90,667,177	601,874	101,471,567	690,918
Ontario.....	287,930,763	2,311,499	221,600,575	1,664,184	322,524,414	2,557,068
Manitoba.....	45,094,180	465,282	26,818,000	254,591	59,110,000	544,548
Saskatchewan.....	12,024,070	125,459	8,262,936	87,566	14,416,770	144,316
Alberta.....	31,384,740	353,672	25,521,911	240,336	45,479,855	441,606
British Columbia..	12,522,045	131,137	18,152,362	169,546	28,445,758	305,520
Totals.....	517,937,648	4,250,246	406,742,030	3,128,734	596,493,364	4,843,101

The exports and imports of building brick since 1891 and 1880 respectively are shown in the two following tables. The exports have never been large, averaging for a number of years past about \$6,000 in value per annum, but falling in 1909 to a value of \$2,255. The annual imports for a number of years previous to 1903 averaged only about \$20,000 in value; during the past six years, however, the value of the imports has varied from \$100,000 to nearly \$200,000 per annum. During the calendar year 1909 the imports were 27,972,000 brick, valued at \$195,360: of which, 1,738,000 valued at \$21,680, an average of \$12.47 per M, were imported from Great Britain; and 26,234,000 valued at \$173,680, an average of \$6.62 per M, from the United States.

## Exports of Building Brick.

Calendar Year.	M.	Value.	Calendar Year.	M.	Value.	Calendar Year.	M.	Value.
		\$			\$			\$
1891.....	246	1,163	1898.....	65	442	1904... ..	696	5,357
1892.....	1,963	12,192	1899.....	172	1,351	1905.....	754	5,888
1893.....	6,073	44,110	1900.....	546	4,528	1906.....	697	6,541
1894.....	1,095	7,405	1901.....	646	5,189	1907.....	802	6,193
1895.....	1,655	8,665	1902.....	2,110	12,786	1908.....	2,344	9,047
1896.....	983	5,678	1903.....	891	5,699	1909.....	365	2,255
1897.....	573	2,679						



## Imports of Building Brick.

Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.
		\$			\$			\$
1880.....	340	2,067	1890.....	1,933	12,500	1900.....	1,792	19,305
1881.....	415	4,281	1891.....	589	9,744	1901.....	2,800	20,677
1882.....	3,500	24,572	1892.....	621	5,075	1902.....	4,087	33,802
1883.....	1,448	14,234	1893.....	1,489	14,108	1903.....	2,881	28,493
1884.....	3,263	20,258	1894.....	2,220	18,320	1904.....	13,455	117,468
1885.....	3,108	14,632	1895.....	575	4,705	1905.....	25,515	168,122
1886.....	983	5,929	1896.....	1,057	23,189	1906.....	21,934	194,897
1887.....	276	2,440	1897.....	2,094	10,336	1907 (9mos)	8,495	88,144
1888.....	2,483	20,720	1898.....	639	6,652	1908.....	13,790	139,105
1889.....	2,590	24,585	1899.....	2,611	21,306	1909.....	10,894	103,773

*Prices* :—The price of brick is somewhat lower in the eastern parts of Canada than in the west. The average price of common brick at the yard in 1907, according to the returns furnished by the producers, ranged from a minimum of \$5.47 in Nova Scotia to a maximum of \$10.67 in Alberta. Prices in 1908 averaged somewhat higher in the Maritime Provinces, but lower in Ontario and the west ; this was a year of comparative dullness in the building trades with a falling off in production. In 1909, however, the demand became brisk again and prices averaged somewhat higher, running from a minimum of \$5.69 in Nova Scotia to a maximum of \$9.73 in British Columbia.

The following table shows the average prices of common and pressed brick in the several provinces during 1907, 1908, and 1909. These are the average values of brick sold at the yard as furnished by the producers.

## Average Prices per Thousand of Common and Pressed Brick.

	Common Brick.			Pressed Brick.		
	1907.	1908.	1909.	1907.	1908.	1909.
Nova Scotia.....	\$ 5.47	\$ 5.81	\$ 5.69	\$12.53	\$13.84	\$12.36
New Brunswick..	7.45	8.17	7.14	8.21	16.70	12.00
Quebec.....	6.43	6.37	6.38	11.60	11.62	14.00
Ontario.....	7.61	7.24	7.71	9.45	8.74	9.46
Manitoba.....	10.19	9.24	9.14	13.67	15.45	12.00
Saskatchewan.....	10.43	10.46	9.66	.....	11.18	14.00
Alberta.....	10.67	8.60	9.21	17.89	12.97	13.03
British Columbia..	10.45	9.21	9.73	20.95	20.40	31.05
Canada.....	7.87	7.39	7.81	10.07	9.67	11.01

*Ontario*.—Over 52 per cent of the total production of building brick in Canada in 1909 was made in the Province of Ontario, and of the Ontario production over 47 per cent was made in the county of York, so that the City of Toronto and vicinity produces about one quarter, or including the county of Halton, nearly 30 per cent of the total brick production of Canada; Wentworth county, or the vicinity of Hamilton, is perhaps the next important brick centre, producing over 7 per cent of the Ontario output. The counties of Carleton and Russell, or the Ottawa district, are the next in order with a little under 7 per cent. Other important districts are Algoma and Nipissing, which cover a wide area, and the western counties of Middlesex, Kent, Waterloo, and Simcoe. These eleven counties contributed over 82 per cent of the Ontario production. Practically all the pressed brick, reported as such, was made in Toronto and vicinity.

The production of these counties in 1909 is shown in tabular form herewith.

#### Production of Common and Pressed Brick by Principal Counties.

County.	COMMON.			PRESSED.			Total Value.	Per cent.
	No.	Value.	Per M.	No.	Value.	Per M.		
		\$	\$ c.		\$	\$ c.	\$	%
York.....	118,604,500	969,032	8 17	27,125,800	250,461	9 23	1,219,493	47·69
Halton .....	9,705,300	72,033	7 42	12,790,900	126,662	9 90	198,695	7·77
Wentworth.....	26,799,250	188,577	7 04	.....	.....	.....	188,577	7·37
Carleton .....	12,903,165	101,618	7 88	.....	.....	.....	101,618	3·97
Algoma.....	8,667,000	81,250	9 37	200,000	2,800	14 00	84,050	3·29
Russell.....	11,600,000	66,250	6 02	.....	.....	.....	66,250	2·59
Nipissing .....	6,500,000	55,950	8 61	.....	.....	.....	55,950	2·19
Middlesex.....	7,023,050	54,030	7 69	60,000	510	8 50	54,540	2·13
Kent .....	7,592,000	48,020	6 33	.....	.....	.....	48,020	1·88
Waterloo .....	6,842,160	46,968	6 86	.....	.....	.....	46,968	1·84
Simcoe.....	6,108,000	44,280	7 25	.....	.....	.....	44,280	1·73
Total, 11 counties...	221,744,425	1,728,008	7 79	40,176,700	380,433	9 47	2,108,441	82·45
Total, other counties	59,934,089	442,493	7 38	669,200	6,134	9 17	448,627	17·55
Total, Ontario .....	281,678,514	2,170,501	7 71	40,845,900	386,567	9 46	2,557,068	100·00

The annual production of common and pressed brick in this Province since 1898, as ascertained by the Ontario Bureau of Mines, is shown in the following table. The figures show the total quantity and value of the brick made, as distinguished from the sales given in the previous table.

# Building Brick made in Ontario since 1898.

(From the reports of the Ontario Bureau of Mines.)

	COMMON BRICK.			PRESSED BRICK.		
	M.	Value.	Average per M.	M.	Value.	Average per M.
		\$	\$ cts.		\$	\$ cts.
1898.....	170,000	914,000	5 376	8,970	100,344	11 187
1899.....	233,898	1,313,750	5 617	10,808	105,000	9 715
1900.....	240,430	1,379,590	5 738	11,562	114,419	9 896
1901.....	259,235	1,530,460	5 903	12,846	104,394	8 127
1902.....	220,500	1,411,000	6 399	19,755	144,171	7 298
1903.....	230,000	1,561,700	6 790	23,703	218,550	9 220
1904.....	200,000	1,430,000	7 150	26,857	226,750	8 443
1905.....	250,000	1,937,500	7 750	26,000	234,000	9 000
1906.....	300,000	2,157,000	7 190	39,860	337,795	8 475
1907.....	273,882	2,109,978	7 704	69,763	648,683	9 298
1908.....	222,361	1,575,875	7 087	56,167	485,819	8 649
1909.....	246,308	1,916,147	7 779	53,167	490,571	9 227

In reviewing the brick industry of Ontario, the Director of the Bureau of Mines states "The demand for brick was active during the year, especially in the larger cities, building operations in Toronto, for instance, which is essentially a city of brick, being decidedly brisk. A large quantity of brick is manufactured in and around Toronto, many of the brick-yards being extensive and well equipped. Reference to the figures published by the Bureau as to the production of brick, shows that the average value at the yard has risen from \$5.73 per thousand in 1901 to \$7.78 per thousand in 1909, an increase of over 35 per cent. The cost of brick constructions has been heavily affected during the same time, since the cost of labour has experienced an advance probably quite as great.

"There has of late years been a marked improvement in the quality of brick made in first-class yards. Kilns of modern construction burn harder and more evenly, and there is a smaller proportion of soft brick. The present taste in brick houses too, does not demand the same uniformity of colour that was formerly insisted upon; in fact, a variety of shade, instead of being objected to, is rather desired. There is also a much greater range of products than was made years ago. From white and buff to cherry red, and up to a dark even purplish hue, bricks of all tints and shades are freely used, and pleasing effects are sometimes obtained by employing clinker or overburned bricks, greenish or yellowish in colour."

*Paving Brick* :—Paving bricks are made in Ontario only at West Toronto, from shale found on the banks of the Humber river. The annual production has been fairly constant at from 3,000,000 to 5,000,000 brick per season. The output finds a market chiefly in Toronto. Statistics of production are available since 1897 and are shown in the next table. The average price per thousand has varied from \$8 to \$20.

In 1909 the number of paving brick sold was 3,759,803, valued at \$67,408 ; while during the same year there were imported paving brick valued at \$139,366. Statistics of production and imports of paving brick are shown in the two tables following :—

### Annual Production of Paving Brick (a).

Year.	M.	Value.	Average per M.	Year.	M.	Value.	Average per M.
		\$	\$ cts.			\$	\$ cts.
1897.....	4,568	45,670	10 00	1904 . . . . .	4,436	55,450	12 50
1898.....				1905.....	4,500	54,000	12 00
1899.....	5,300	42,550	8 03	1906.....	3,000	45,000	15 00
1900.....	2,710	26,950	9 94	1907 . . . . .	3,618	72,354	20 00
1901.....	3,689	37,000	10 03	1908.....	3,720	59,456	15 98
1902.....	4,211	42,000	9 97	1909.....	3,760	67,408	17 93
1903.....	3,789	45,288	11 95				

(a) Figures previous to 1907 compiled from Ontario Bureau of Mines.

### Imports of Paving Brick.\*

Fiscal Year.	M	Value.	Average per M.	Fiscal Year.	M.	Value.	Average per M.
		\$	\$ cts.			\$	\$ cts.
1895.....	275	5,006	18 20	1903 . . . . .	1,337	18,811	14 07
1896.....	918	10,132	11 04	1904.....	1,986	29,753	14 98
1897.....	52	719	13 83	1905.....	2,350	32,578	13 86
1898.....	367	2,337	6 37	1906.....	4,104	46,008	11 21
1899.....	1,583	23,643	14 94	1907 (9 mos.).....	2,182	23,256	10 66
1900.....	2,175	35,644	16 39	1908.....	5,340	61,346	11 49
1901.....	900	10,414	11 57	1909.....		101,187	†
1902.....	1,030	16,788	16 30				

\* Duty 20 per cent.

† The imports during July, 1908, under the general tariff, are reported as 6,581 M, value \$7,317, an apparent error. There appears also to be an error in the entries for July, August, and September of the same year. The total number has, therefore, been omitted. The actual value of the imported brick varies from \$10 to \$12 per M.

*Fireclay and Fireclay Products* :—There are a number of clays from different localities that have been used in the manufacture of refractory brick or firebrick, and for furnace linings, etc., which have been usually termed fireclays. These include clays found with the Coal Measures at Westville, Nova Scotia, and at Comox, Vancouver island, also clays found south of Moosejaw, Saskatchewan, and at Clayburn, near the city of Vancouver, British Columbia. Stove lining and other refractory clay products are made at several places in Ontario and Quebec from imported fireclays.



The total value of the sales of fireclay, firebrick, and fireclay products in 1909 was \$78,132, as compared with a valuation of \$110,302 in 1908 and \$131,322 in 1907.

The production of 1909 comprised 1,059,270 firebrick valued at \$32,742, or an average of \$30.92 per M ; fireclay sold, 4,405 tons valued at \$12,390, and other fireclay products valued at \$33,000.

Fireclay products in 1908 included 2,415,871 firebrick valued at \$70,429, an average of \$29.16 per M ; fireclay sold, 1,984 tons valued at \$8,121, and other fireclay products valued at \$31,752. The 1907 production comprised 4,323,179 firebrick valued at \$113,322, an average of \$26.21 per M ; and other fireclay shapes to the value of \$18,000.

Firebricks were imported during the calendar year 1909 to the value of \$485,994, of which \$426,602 worth was derived from the United States and \$59,392 from Great Britain.

The imports during the fiscal year ending March, 1909, were valued at \$350,457, and during the fiscal year ending March, 1908, the imports were valued at \$639,347. The imports of fireclay during the calendar year 1909 were valued at \$86,161, and were derived chiefly from the United States and Great Britain.

During the fiscal year ending March, 1909, fireclay was imported to the value of \$77,146, and the imports during the fiscal year ending March, 1908, were valued at \$155,873.

Statistics of the imports of firebrick and of fireclay for a number of years are shown as follows :—

#### Imports of Firebrick and Fireclay, 1900-9.

Fiscal Year.	Fireclay.	Firebrick.	Fiscal Year.	Fireclay.	Firebrick.
	\$	\$		\$	\$
1900.....	59,291	39,535	1905.....	73,837	44,746
1901.....	79,530	32,831	1906.....	131,130	51,892
1902.....	64,541	45,608	1907*.....	85,044	349,185
1903.....	94,509	34,522	1908.....	155,873	639,347
1904.....	52,716	38,335	1909.....	77,146	350,457

\* 9 months ending March.

*Sewerpipe and Drain Tile*.:—The total value of the sales of sewerpipe in 1909 was \$645,722, as compared with a value of \$514,362 in 1908, and a value of \$667,100 in 1907.

The imports of drain pipe and sewerpipe during the calendar year 1909 were valued at \$170,280 : of which \$135,809 worth were imported from the United States; \$34,200 from Great Britain, and \$271 from other countries. During the



twelve months ending March, 1909, the imports were valued at \$106,399, and during the twelve months ending March, 1908, the value was \$125,747.

Following is a list of firms manufacturing sewerpipe :—

Standard Drain Pipe Co. of St. Johns.....	New Glasgow, N.S. St. Johns, Que.
Ontario Sewer Pipe Company.....	Toronto, Ont.
Dominion Sewer Pipe Company.....	"
Hamilton & Toronto Sewer Pipe Co., Ltd....	Hamilton, Ont.
B. C. Pottery Company.....	Victoria, B.C.

There was a considerably increased demand for drain tile in 1909, and the total sales reported to this Branch were 27,571,097 valued at \$408,440, an average of \$14.81 per M; as compared with sales of 20,100,261 valued at \$298,561, or an average of \$14.85 per M, in 1908. The Ontario Bureau of Mines reports the total quantity made in that Province in 1909 as 27,418,000 valued at \$363,550, or an average of \$13.25 per M; as compared with 24,800,000 valued at \$338,658, or an average value of \$13.66 per M, in 1908.

The imports of unglazed drain tile are comparatively small, the value in 1909 being \$2,785 only.

Statistics of the annual production of sewerpipe, and of the imports of drain tile and sewerpipe, are shown in the next three tables.

#### Production of Sewerpipe, etc.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1888 . . . . .	266,320	1896 . . . . .	153,875	1904 . . . . .	440,894
1889 . . . . .	Not available.	1897 . . . . .	164,250	1905 . . . . .	382,000
1890 . . . . .	348,000	1898 . . . . .	181,717	1906 . . . . .	350,045
1891 . . . . .	227,300	1899 . . . . .	161,546	1907 . . . . .	667,100
1892 . . . . .	367,660	1900 . . . . .	231,525	1908 . . . . .	514,362
1893 . . . . .	350,000	1901 . . . . .	248,115	1909 . . . . .	645,722
1894 . . . . .	250,325	1902 . . . . .	301,965		
1895 . . . . .	257,045	1903 . . . . .	317,970		

#### Production of Drain Tile in Ontario.

(As ascertained by the Ontario Bureau of Mines).

Year.	No.	Value.	Year.	No.	Value.	Year.	No.	Value.
		\$			\$			\$
1891 . . . . .	7,500,000	90,000	1898 . . . . .	22,668,000	225,000	1905 . . . . .	15,000,000	220,000
1892 . . . . .	10,000,000	100,000	1899 . . . . .	21,027,400	240,246	1906 . . . . .	17,700,000	252,500
1893 . . . . .	17,300,000	190,000	1900 . . . . .	19,544,000	209,738	1907 . . . . .	15,578,000	250,122
1894 . . . . .	25,000,000	280,000	1901 . . . . .	21,592,000	231,374	1908 . . . . .	24,800,000	338,658
1895 . . . . .	14,330,000	157,000	1902 . . . . .	17,510,000	199,000	1909 . . . . .	27,418,000	363,550
1896 . . . . .	13,200,000	144,000	1903 . . . . .	18,200,000	227,000			
1897 . . . . .	.....*	*	1904 . . . . .	16,000,000	210,000			

\* Not stated.

## Imports of Drain Tile and Sewerpipe.

Fiscal Year.	Drain Tile (a).	Sewerpipe (b).	Fiscal Year.	Drain Tile (a).	Sewerpipe (b).
	\$	\$		\$	\$
1880.....		33,796	1895.....	695	20,358
1881.....		37,368	1896.....	339	18,957
1882.....		70,061	1897.....	416	33,870
1883.....		70,699	1898.....	157	29,454
1884.....	5,585	66,170	1899.....	1,827	32,071
1885.....	2,911	66,678	1900.....	1,383	37,766
1886.....	1,905	56,048	1901.....	1,264	54,819
1887.....	2,183	69,020	1902.....	269	55,261
1888.....	4,230	96,967	1903.....	252	57,100
1889.....	2,346	80,869	1904.....	1,637	53,958
1890.....	3,780	73,654	1905.....	1,229	101,166
1891.....	673	86,522	1906.....	4,727	131,353
1892.....	473	59,064	1907 (9 mos.)....	12,106	93,458
1893.....	110	33,891	1908.....	2,080	125,747
1894.....	53	24,572	1909.....	2,394	106,399

(a) Drain tile, not glazed.

(b) Drain pipes, sewerpipes, chimney linings, or vents, chimney tops and inverted blocks, glazed or unglazed.

*Pottery and Earthenware.*—The pottery made from Canadian clays has been, hitherto, chiefly of the common grades, such as flowerpots, jardinières, crocks, jars, churns, etc. A number of potters make a higher grade product of stoneware, but the majority of these use imported clays. Sanitary ware is made at St. Johns, Que., and other points; but the raw material, including clays and feldspar, is nearly all imported.

The total value of the production of pottery and sanitary ware in 1909, according to returns received, was \$285,285; as compared with a valuation of \$200,541 reported for 1908. Annual statistics of production are shown herewith.

## Annual Production of Pottery.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1888.....	27,750	1896.....	163,427	1903.....	200,000
1889.....	Not available..	1897.....	123,629	1904.....	140,000
1890.....	195,242	1898.....	214,675	1905.....	120,000
1891.....	258,844	1899.....	185,000	1906.....	150,000
1892.....	265,811	1900.....	200,000	1907.....	253,809
1893.....	213,186	1901.....	200,000	1908.....	200,541
1894.....	162,144	1902.....	200,000	1909.....	285,285
1895.....	151,588				

Details of the imports of earthenware and chinaware showing the values imported and countries of origin, have already been given on pages 15, 16, and 17.

The total imports in 1909 were valued at \$1,781,759, of which the principal item is "tableware of china, porcelain, white granite or ironstone ware," to a value of \$1,212,365. Great Britain is the principal source of the imports of this class of clays, but quite large supplies are also obtained from the United States, Germany, France, Austria-Hungary, and Japan.

### Imports of Earthenware and Chinaware.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	322,333	1890.....	695,206	1900.....	959,526
1881.....	439,029	1891.....	634,907	1901.....	1,114,677
1882.....	646,734	1892.....	748,810	1902.....	1,275,093
1883.....	657,886	1893.....	709,737	1903.....	1,406,610
1884.....	544,586	1894.....	695,514	1904.....	1,611,356
1885.....	511,853	1895.....	547,935	1905.....	1,636,214
1886.....	599,269	1896.....	575,493	1906.....	1,692,359
1887.....	750,691	1897.....	595,822	1907 (9 mos.)...	1,422,880
1888.....	697,082	1898.....	675,874	1908.....	2,190,784
1889.....	697,949	1899.....	916,727	1909.....	1,716,887

The existence in Canada of commercially available clays suitable for the manufacture of the better grades of stoneware and pottery has not, as yet, been definitely determined, although it is quite reasonable to expect that such clays will yet be found, particularly in the western portion of the country.

Prospecting for clays has not yet the same lure as has that for the metals or other mineral products, and the determination of the value of a clay deposit presents, perhaps, a little more difficulty to the prospector than the recognition of some metalliferous ores.

In the United States a great deal of valuable work has been done in connexion with the investigation of the value of clay deposits.

Similar investigations of Canadian clay resources were initiated by the Mines Branch in 1905, when a report was prepared on the Clay Resources of Manitoba. This work has been continued by the Geological Survey Branch; Dr. Heinrich Ries having spent the season of 1908 in the Maritime Provinces, and the summer of 1909 in Alberta.

Although a complete report of the laboratory experiments on the Nova Scotia clays has not yet been made, the results of the field investigation are of sufficient interest to justify the following extracts from Dr. Ries' preliminary report.<sup>1</sup> "The object of the study was to ascertain as far as possible, what geological formations were clay and shale-bearing, and which of these deposits were adapted to the manufacture of clay products. \* \* \* \* \*

<sup>1</sup>Summary Report, Geological Survey Branch, Department of Mines, 1909, p. 240.  
11797- -18

### Important Clay-bearing Formations.

"From what has been said above, it will be seen that the formations likely to yield clay or shale deposits of value must be the lower Carboniferous, Millstone Grit, Coal Measures, and Pleistocene. These are few in number, but nevertheless they underlie areas of considerable size.

*"Lower Carboniferous.*—Underlying, as they do, a rather extensive area in central Nova Scotia, and another one in Cape Breton, it is to be regretted that the lower Carboniferous rocks have not been more widely looked into by clay-product manufacturers. The formation is, however, somewhat variable in its character, carrying, as it does, beds of shale, conglomerate, gypsum, and limestone. Those shales closely associated with the gypsum beds may be of value for common brick manufacture, although they frequently contain considerable quantities of impurities, such as gypsum nodules, concretions of iron carbonate, or sandy streaks. At some points though, as near Pugwash, the shale occurs in large beds, and works up well to a plastic mass: the more so as it is slightly weathered. At that locality it supports one of the most active and best equipped brick plants in the Province.

"Northeast of Shubenacadie, also, promising shales were found in the lower Carboniferous, while in the so called limestone series around Sydney there were found a number of beds which appear promising for brick manufacture, provided the sandstone layers do not occur too thickly.

*"Millstone Grit.*—This is well exposed in the area north of the Coal Measures in the Joggins district; north of the Pictou Coal Measures; south and southeast of Hawkesbury; and west and southwest of the Sydney coal field.

"One cannot predict the universal distribution of promising clay or shale beds in the Millstone Grit, but small beds are not uncommon. Unfortunately, outcrops are scarce in many of the areas underlain by the rocks of this age, which increased the difficulty of finding clays or shales in it. Several deposits of fair importance were seen, and may be referred to in passing. In the Sydney region, a pit has been opened near the Steel works, exposing a bed of soft bluish shale, not less than 5 feet in thickness. A second deposit occurs near the coke oven plant of the Dominion Iron and Steel Company, and a third one outcrops along the east shore of Sydney harbour, near Victoria Mines post-office. Although the tests of these have not yet been completed, it is highly probable that they represent a grade of material considerably higher than brick clay.

"In the Pictou coal region, a rather heavy bed of mottled, shaly clay has been found northeast of Woodbourne station, on the Intercolonial railway. Preliminary tests have shown its adaptability to the manufacture of pressed brick. It may be said here, that there is some doubt as to whether this bed lies in the Millstone Grit or Permian conglomerate, but the former view seems the more reasonable.

"The Millstone Grit contains at least one shale bed of some thickness in the Joggins area; but it is probably of red burning character.



*“Coal Measures.*—These represent the most important clay and shale-bearing formations of Nova Scotia, and were carefully examined in the several areas in which they occur. The largest is the Sydney field, of Cape Breton, and extends from the Big Bras d’Or channel to Cow bay, with only one important interruption, at Cape Percy on the northeastern shore of Cow bay, where the Millstone Grit cuts out the Coal Measures.

“Owing to the almost uninterrupted line of cliffs which fringe the shore-line, a fine series of exposures was obtained. The Sydney coal field is cut into several parts by somewhat deep northeast-southwest bays; which has rendered it difficult for geologists to correlate the sections of the several subdivisions of the field. It can be said that the coal seams are interstratified with a series of shales and sandstones. These are bent into a number of gentle folds, forming the bottom of a broad trough which dips out under the sea. Throughout the field, therefore, low dips prevail. This gives the beds broad outcrops, but still the dip is sufficient to carry the bed rapidly under cover. Toward the northwestern and southeastern parts of the field the sandstone beds predominate, and the shales are of poorer quality, but in the central portion the shales are as abundant as the sandstones. The shales themselves range from smooth, fine-grained, plastic ones, of grey or red colour, to others which are quite siliceous in their character, and of doubtful value. One important deposit is found underlying a large portion of Cranberry head, near Sydney Mines. It is a smooth, greyish shale, and may prove of value for vitrified wares. In the final report it will probably be referred to as the Cranberry Head type, as it appears at a number of points. A second type found at a number of localities in the Nova Scotia Coal Measures is a somewhat soft, reddish shale, well exposed along the shore just west of Cranberry head. Not a few of the shale beds are rather siliceous in appearance and touch, and it would be unwise to express any definite opinion on them until the tests have been completed.

“It seems curious that up to the present time these shales have been completely overlooked; and while it is true that they do not occur in deposits of great thickness, still they are easily accessible, and are capable of supplying a considerable quantity of raw material.

“Numerous references to fireclays in the Sydney field have been published; but as far as we were able to ascertain, this region does not contain any high grade fireclays, although some of them may prove to be low grade. Unfortunately most coal miners have formed the habit of calling any ‘under clay’ a fireclay.

*“Picton Field.*—In this field there are numerous shale beds associated with the coal seams, but they are best developed in the central portion of the area, and the most important known up to the present time are higher up in the section than the coal beds. Many of these shales when ground and mixed with water are of strong plasticity, but they unfortunately contain such a high percentage of carbonaceous matter as to require great care in burning, and some of the shale beds are too high in carbonaceous or petroliferous matter to be used at all; while others have to be avoided on account of the abundant siderite concretions; but in spite of these disadvantages, the field is an important holder of commercially valuable



shale deposits. In some parts of the section, as along Coal creek, south of the Allan shaft at Stellarton, the beds of shale are occasionally quite free from carbonaceous material. In only one instance is an under clay worked, viz., at the Drummond colliery at Westville, where a hard shale is mined for the manufacture of bricks. The most important utilization of the shales is near New Glasgow, where they are made into common and pressed brick, flue linings, sewerpipe, and drain tile. Pleistocene drift clay is sometimes added to the pipe mixture.

*“Inverness Field.*—This small field carries a number of shale beds associated with the coals, but few of them are of great thickness; indeed, none of them are equal in volume to those worked in the Pictou area. A good bed outcrops on the shore a few hundred feet south of the dock, and a plastic shale is said to underlie the 7 ft. coal. Most important, however, is the bed of grey, plastic clay which overlies the 13 ft. seam, and is found at several points where that seam is cut through by streams. It is, probably, a No. 2 fireclay, and varies in thickness from 18 inches to 3 feet. If the tests prove it to be of refractory character, it would be practicable to work it in connexion with the coal.

*“Port Hood Field.*—Here, too, there are scattered shale occurrences in both the Millstone Grit and Coal Measures; but the most important is along the shore a short distance north of Judique harbour, where a bluish-grey shale, with a vertical dip, and about 8 to 10 feet thick, outcrops for some distance along the shore.

*“Joggins Area.*—This field contains a number of thin shale seams interstratified with sandstone in the Coal Measure rocks, but few of them are of any thickness. The most important, perhaps, is south of McIntyre brook; while a second one, of possible value, underlies the coal seam at Joggins.

*“Pleistocene Clays.*—These may be roughly divided into two classes: (1) glacial clays, usually of stony character, but very plastic, tough, and red burning; and (2) marine clays, often strongly laminated, but also quite plastic and red burning. These two types of clay are rarely used for anything but drain tile and common brick. A few pressed brick are made from them, and the smoother ones could be utilized for the manufacture of common ornamental terra-cotta and cheap art pottery. The marine clays are best developed in the Annapolis and Shubenacadie valleys, while the stony, glacial clays are worked mainly in the Cape Breton region.

“A most remarkable clay, and one of undetermined age, is that found at Shubenacadie and in the Musquodoboit valley. The material is a highly plastic clay, of dark grey, white, or mottled red and white colour, lying beneath the glacial drift, and resting, possibly, on bed-rock. Its thickness, as indicated by a series of borings made by Mr. Keele, ranges from 7 to probably 50 feet. Scattered lumps of lignite were found in the clay at Shubenacadie, and it is hoped that the age of these can be determined.

"It is exceedingly difficult to determine the exact area underlain by this deposit, owing to the heavy mantle of glacial drift covering the region ; but the fact that the material is found at several points extending over a distance of 7 miles, indicates its probable extent, unless some of the masses have been pushed along with the drift. Borings could, of course, only be made at those points where the drift cover was thin or absent.

"The clay burns to a cream colour, and fairly dense body at a comparatively low temperature. It is at least semi-refractory in its character, and may prove to be a stoneware clay. Some test bricks were made from a carload lot of this clay, taken from a shaft sunk in the deposit at Shubenacadie.

"It is safe to say that nothing like it has been found elsewhere in Nova Scotia, and its resemblance to some of the Cretaceous fireclays of New Jersey is striking.

### **New Brunswick.**

"As most of our time was required for the examination of the Nova Scotia clays, but little of the field season was left for New Brunswick. Several localities were examined, and the following is a condensed statement of the results.

"In the vicinity of Albert Mines, in Albert county, there are some very promising beds of Devonian shales, which are probably of red burning character. In the event of the oil-shales at that locality being developed, these shales will be of importance for brick manufacture, but aside from this, they may prove to be of value for making pressed brick to be shipped to other markets. Nearby there are also red burning shales of lower Carboniferous age. Some of the latter are located along the line of the railway.

"Many shale deposits, some of which may prove to be of refractory character, are associated with the coal deposits around Minto and Chapman, northeast of Grand lake. Similar shales underlie and overlie the coal 12 miles southeast of Harcourt.

"Marine clays are worked for common, and some pressed brick, at both St. John and Fredericton.

### **Prince Edward Island.**

"The only clay resources of Prince Edward Island are of Pleistocene age. Common brick clays are found at a number of points, but are worked to only a slight extent.

### **Clay Working Industry.**

"Up to the present time, the clay deposits of Nova Scotia have been but little developed. Common brick are made at Annapolis, Middleton, and Avonport, in the Annapolis Valley region, and at Shubenacadie, and Elmsdale in the Shubenacadie valley. Other yards are in operation at Sylvester, New Glasgow, Pugwash, Eden Siding, and Mira River. In most cases these are operated to supply a rather local demand, although the Annapolis and Pugwash brick are sometimes

shipped some distance by water. Common pottery is made from the smoother sections of the surface clays south of Elmsdale. Most of the common brick-yards re-press a few brick. A hard brick, known in the trade as a firebrick, but not really such, is made from the Carboniferous shales at Westville. Sewerpipe, flue linings, and drain tile are made from the shales at New Glasgow; and some drain tile are manufactured in the Annapolis valley by the same firms that produce brick.

"It will be seen, therefore, that there is considerable room for expansion. If such development occurs, the markets will be mainly outside of the Province, except for common brick. At present the buildings in that region are constructed mainly of wood; but as the supply of this becomes scarcer and more expensive, brick must be utilized as a substitute. For outside markets, the plants should be located as near to water as possible, to avoid rail shipment.

"It is hoped that the studies of the samples now being carried on will demonstrate the value of the clay and shales for making pressed brick, vitrified brick, earthenware, and perhaps stoneware, sewerpipe, etc."

## LIME.

The activity of building operations in 1909 is reflected also in the statistics of lime production for that year. The total sales were reported as 5,592,924 bushels, valued at \$1,132,756, or an average of 20 cents per bushel; as compared with 3,601,468 bushels, valued at \$712,947, or an average of 20 cents per bushel in 1908. The returns of production for 1909, particularly for the Provinces of New Brunswick and Manitoba, were probably a little more complete than those for 1908, so that the actual increase may not be quite so large as is indicated in the above figures.

The production or sales by provinces during the past four years is shown in the tables following. A small quantity of lime is usually made in Prince Edward Island, but mostly from stone brought over from Nova Scotia, and the figures have been included in the statistics for this Province.

Lime Production by Provinces, 1906 and 1907.

Province.	1906.				1907.			
	Bushels.	Value.	Average per Bushel.	%	Bushels.	Value.	Average per Bushel.	%
		\$	cts.			\$	cts.	
Nova Scotia.....	50,000	13,600	27	2.3	45,000	16,000	35	1.6
New Brunswick.....	405,450	94,290	23	9.3	554,330	124,786	23	12.8
Quebec.....	923,563	201,816	22	20.0	1,053,856	262,990	25	27.0
Ontario.....	2,885,000	496,785	17	49.2	2,333,879	393,474	17	40.4
Manitoba.....	620,201	119,792	19	11.9	431,548	84,793	20	8.7
Saskatchewan.....					3,760	1,480	40	0.2
Alberta.....	240,000	56,200	23	5.6	173,040	41,225	24	4.2
British Columbia....	106,192	26,694	25	2.7	159,963	49,847	31	5.1
	5,230,406	1,009,177	19	100.0	4,755,316	974,595	20	100.0

## Lime Production by Provinces, 1908 and 1909.

Province.	1908.				1909.			
	Bushels.	Value.	Average per Bushel.	%	Bushels.	Value.	Average per Bushel.	%
		\$	cts.			\$	cts.	
Nova Scotia .....	51,068	16,102	32	2·3	57,730	16,729	29	1·5
New Brunswick .....	155,748	34,262	22	4·8	697,466	154,151	22	13·6
Quebec .....	857,700	201,357	23	28·2	1,281,827	315,633	25	27·9
Ontario .....	2,087,731	358,507	17	50·3	2,619,553	434,147	17	38·3
Manitoba .....	138,786	24,192	17	3·4	423,954	69,670	16	6·2
Alberta .....	135,000	34,500	26	4·8	281,125	67,350	24	5·9
British Columbia.....	176,435	44,027	25	6·2	231,269	75,076	32	6·6
	3,601,468	712,947	20	100·0	5,592,924	1,132,756	20	100·0

As with the other structural materials, Ontario is the largest producer, this Province being credited with 38 per cent of the total value during 1909.

Quebec province has also a very considerable lime production, contributing about 28 per cent of the total value; and next to these in importance comes New Brunswick. The average price per bushel in the several provinces ranged from 16 cents in Manitoba to 32 cents in British Columbia. The average price per bushel in Ontario has remained constant during the past four years at 17 cents. Statistics of the annual production of lime in Ontario as published by the Ontario Bureau of Mines are available since 1896, and are shown in the next table. These returns are slightly higher than those obtained by the Mines Branch.

## Annual Production of Lime in Ontario.

(As ascertained by the Ontario Bureau of Mines).

Calendar Year.	Bushels.	Value.	Cents. per Bushel.	Calendar Year.	Bushels.	Value.	Cents. per Bushel.
		\$				\$	
1896 .....	1,880,000	222,000	12	1903 .....	3,400,000	520,000	15
1897 .....				1904 .....	2,600,000	406,800	16
1898 .....	2,620,000	308,000	12	1905 .....	3,100,000	424,700	14
1899 .....	4,342,500	535,000	12	1906 .....	2,885,000	496,785	17
1900 .....	3,893,000	544,000	14	1907 .....	2,650,000	418,700	17
1901 .....	4,100,000	550,000	13	1908 .....	2,442,331	448,596	18
1902 .....	4,300,000	617,000	14	1909 .....	2,633,500	470,858	18

*Exports and Imports.*—The value of the lime exported during the calendar year 1909 was \$48,821, the destination of shipments being mainly the United States.



The imports during the same period were 168,357 barrels valued at \$118,239, and were derived chiefly from the United States.

Annual statistics of exports and imports are given in the next two tables:—

### Exports of Lime.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1891.....	119,853	1898.....	49,594	1905.....	85,723
1892.....	121,535	1899.....	73,565	1906.....	57,072
1893.....	86,623	1900.....	80,852	1907.....	55,903
1894.....	83,670	1901.....	99,194	1908.....	43,316
1895.....	71,697	1902.....	116,009	1909.....	48,821
1896.....	70,820	1903.....	131,412		
1897.....	53,177	1904.....	73,838		

### Imports of Lime.

Fiscal Year.	Bls.	Value.	Fiscal Year.	Bls.	Value.
		\$			\$
1880.....	6,100	6,013	1895.....	12,008	5,743
1881.....	5,796	4,177	1896.....	10,239	7,331
1882.....	5,064	5,365	1897.....	16,108	10,529
1883.....	7,623	9,224	1898.....	12,850	9,002
1884.....	10,804	11,200	1899.....	15,720	11,124
1885.....	12,072	11,503	1900.....	12,865	11,211
1886.....	11,021	9,347	1901.....	19,657	14,534
1887.....	10,835	8,524	1902.....	24,602	17,584
1888.....	10,142	7,537	1903.....	31,108	22,470
1889.....	13,079	9,363	1904.....	54,359	39,639
1890.....	8,149	5,360	1905.....	98,676	71,588
1891.....	6,259	4,273	1906.....	134,334	93,630
1892.....	6,132	4,241	1907 (9 mos.).....	88,919	67,573
1893.....	6,879	4,917	1908.....	129,379	99,611
1894.....	6,766	4,907	1909. Duty 20 per cent	153,934	106,263

### SAND-LIME BRICK.

For the year 1909 returns were received from nine manufacturers of sand-lime brick, showing total sales to have been 27,052,864, valued at \$201,650, or an average of \$7.45 per thousand.

Annual statistics of production since 1907 are shown below:—

### Annual Production of Sand-Lime Brick.

Calendar Year.	Number.	Value.
		\$
1907.....	16,492,971	167,795
1908.....	17,288,260	152,856
1909.....	27,052,864	201,650



The following is a list of manufacturers of sand-lime brick whose returns of production were received :—

The Schultz Bros. Co., Ltd., Brantford, Ont.  
 Jno. Mann & Sons, Brantford, Ont.  
 The Silicate Brick Co. of Ottawa, Ltd., Ottawa, Ont.  
 The Peterboro Sandstone Brick Co., Ltd., Peterborough, Ont.  
 Toronto Indestructible Brick Co., Ltd., Toronto, Ont.  
 The Brandon Brick & Lumber Co., Brandon, Man.  
 Manitoba Pressed Brick Co., Ltd., Winnipeg, Man.  
 Interocean Pressed Brick Co., Regina, Sask.  
 The Silicate Brick & Lime Co. of Victoria, Victoria, B.C.

## SANDS AND GRAVELS.

No statistics are available as to the production of sand and gravel, but the trade returns of the Customs Department show an export and an import of these materials for a number of years, of which a record is given in the accompanying tables :—

### Annual Exports of Sand and Gravel.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1893.....	329,116	121,795	1902.....	159,793	119,120
1894.....	324,656	86,940	1903.....	355,792	124,006
1895.....	277,162	118,359	1904.....	399,809	129,803
1896.....	224,769	80,110	1905.....	306,937	152,805
1897.....	152,963	76,729	1906.....	336,550	139,712
1898.....	165,954	90,498	1907.....	298,095	119,853
1899.....	242,450	101,640	1908.....	298,954	161,387
1900.....	197,558	101,656	1909.....	481,584	256,166
1901.....	197,302	117,465			

### Annual Imports of Sand and Gravel.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		\$			\$
1893.....	26,065	31,739	1902.....	47,381	58,668
1894.....	41,573	33,506	1903.....	91,518	95,647
1895.....	19,609	24,779	1904.....	110,634	107,547
1896.....	18,953	24,604	1905.....	85,339	92,722
1897.....	21,308	25,222	1906.....	116,500	173,727
1898.....	32,148	43,287	1907 (9 mos.).....	171,700	177,412
1899.....	30,288	42,209	1908.....	266,704	223,043
1900.....	35,713	41,280	1909.....	132,158	136,011
1901.....	35,749	42,891			

## SLATE.

The production of slate continues much the same as in previous years. No new quarries have been opened up, and the output was obtained entirely from the New Rockland slate quarries of Richmond county, Quebec, which have for a number of years been operated under lease by Messrs. Fraser and Davies.

The production for 1909 was reported as 4,000 squares, valued at \$19,000; as compared with a production valued at \$13,496 in 1908, and \$20,056 in 1907.

A small export of slate to the value of \$612 was reported in 1909.

Statistics of annual production since 1886 are shown herewith :—

### Annual Production of Slate.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	5,345	64,675	1898.....		40,791
1887.....	7,357	89,000	1899.....		33,406
1888.....	5,314	90,689	1900.....		12,100
1889.....	6,935	119,160	1901.....		9,980
1890.....	6,368	100,250	1902.....		19,200
1891.....	5,000	65,000	1903.....	5,510	22,040
1892.....	5,180	69,070	1904.....	5,277	23,248
1893.....	7,112	90,825	1905.....		21,567
1894.....		75,550	1906.....		24,446
1895.....		58,900	1907.....	4,335	20,056
1896.....		53,370	1908.....	2,950	13,496
1897.....		42,800	1909.....	4,000	19,000

That there is a more extensive market in Canada than is supplied by slate from Canadian sources is shown by the following statistics of imports :—

The total value of the imports of slate in 1909 was \$135,221, of which \$71,914 was roofing slate, and \$34,085 school writing slates. The imports of roofing slate, school writing slates, and manufactures of slate n. o. p. are chiefly from the United States. Some roofing slate is also imported from Great Britain, while slate pencils principally come from Germany and the United States.

Statistics of imports and exports are shown in the following table :—

### Imports of Slate during the Years 1908 and 1909.

Slate and Manufactures of.	12 months ending March, 1908.	12 months ending March, 1909.	12 months ending Dec., 1909.
	\$	\$	\$
Mantles.....		90	
Roofing slate.....	72,588	62,132	71,914
School writing slate.....	26,834	29,340	34,085
Slate pencils.....	3,898	4,379	6,154
Slate of all kinds and manufactures of.....	27,749	28,124	23,068
	131,069	124,065	135,221

**Exports of Slate.**

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1884.....	539	6,845	1892.....	87	2,038
1885.....	346	5,274	1893.....	178	3,168
1886.....	34	495	1894.....	187	3,610
1887.....	27	373	1895.....	36	574
1888.....	22	475	1896.....	301	8,913
1889.....	26	3,303	1897 to 1907.....	Nil.	Nil.
1890.....	12	153	1908.....		2,539
1891.....	15	195	1909.....	154	612

**Imports of Slate.**

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	21,431	1890.....	22,871	1900.....	53,707
1881.....	22,184	1891.....	46,104	1901.....	72,187
1882.....	24,543	1892.....	50,441	1902.....	72,601
1883.....	24,968	1893.....	51,179	1903.....	84,437
1884.....	28,816	1894.....	29,267	1904.....	86,057
1885.....	28,169	1895.....	19,471	1905.....	93,228
1886.....	27,852	1896.....	24,176	1906.....	112,941
1887.....	27,845	1897.....	21,615	1907 (9 mos).....	95,520
1888.....	23,151	1898.....	24,907	1908.....	131,069
1889.....	41,370	1899.....	33,100	1909.....	118,900

**STONE.**

Statistics of stone production given herewith, include the sales of all classes of stone used for building, monumental and ornamental purposes, stone for paving purposes, curbstone and flagstone, rubble, rip-rap and crushed stone, limestone for furnace flux, sugar factories, etc.; but stone used for burning lime or the manufacture of cement, is not included.

The kinds of stone quarried have been classed as granite, limestone, sandstone, and marble.

The records are practically confined to quarry operations or the production of sawn or polished stone when these operations are carried on by the quarry operators. In addition to this production of stone by regular operators there is no doubt a large stone production by individuals such as farmers and others, for house or barn foundations, concrete work, etc., of which it would be impracticable to obtain any satisfactory record. Much stone is probably also used in railway construction work and in road building, of which no record has yet been obtained.

The statistics obtained for 1909 are much more complete than those for former years, and for that reason it is somewhat difficult to make comparisons.

It is impossible also, except in a few cases, to show the quantity of stone production, so that the value only of the shipment can be given.

The total value of the stone production in 1909 was returned as \$3,127,135. In 1908, the total value, not including limestone for flux, was estimated at \$2,088,613, or, including the stone used for flux, \$2,378,318. In 1909 the total number of men reported employed in connexion with stone quarrying was 4,843, and the wages paid \$2,111,987.

Of the total value of the 1909 production, limestone contributed 68·4 per cent or \$2,139,691 in value; granite, 14·5 per cent or \$454,824; sandstone, 12 per cent or \$374,179; and marble, 5·1 per cent or \$158,441.

Stone was used for building purposes to the value of \$1,170,550 or 37·4 per cent of the total; monumental and ornamental stone a value of \$306,338 or 9·8 per cent; curb, paving, and flagstone, \$279,227 or 8·9 per cent; rubble \$303,120 or 9·7 per cent; crushed stone \$664,287 or 21·3 per cent, and furnace flux \$403,613 or 12·9 of the total.

By provinces, Quebec shows the largest output, having a value of \$1,359,349 or 43·5 per cent; the total being made up of limestone to the value of \$972,253, granite valued at \$257,096, and marble valued at \$130,000. Ontario takes second place with a production of \$748,639 in value or 23·9 per cent of the total: of which limestone is credited with \$639,674; sandstone, \$62,824; granite, \$42,700; and marble, \$3,441. The total production in British Columbia was \$365,081: including granite to the value of \$134,310; sandstone, \$168,553; limestone, \$37,258; and marble, \$25,000. The production in Manitoba was valued at \$331,899: made up of limestone \$328,554, and granite \$3,345. The Nova Scotia production was reported as \$189,604: comprising limestone, \$161,922; sandstone, \$21,850, and granite, \$5,832. New Brunswick is credited with \$42,180: made up chiefly of sandstone and granite. Alberta reported a production of \$90,383, all of sandstone.

#### Production of Stone by Provinces, 1909.

Province.	Granite.	Limestone.	Marble.	Sandstone.	Total.	%
	\$	\$	\$	\$	\$	
Nova Scotia.....	5,832	161,922	.....	21,850	189,504	6·1
New Brunswick.....	11,541	30	.....	30,609	42,180	1·3
Quebec.....	257,096	972,253	130,000	.....	1,359,349	43·5
Ontario.....	42,700	639,674	3,441	62,824	748,639	23·9
Manitoba.....	3,345	328,554	.....	.....	331,899	10·6
Alberta.....	.....	.....	.....	90,383	90,383	2·9
British Columbia.....	134,310	37,258	25,000	168,513	365,081	11·7
Totals.....	454,824	2,139,691	158,441	374,179	3,127,135	100
Per cent.....	14·5	68·4	5·1	12·0	100	



**Value of Stone sold for various purposes in 1909.**

Kind.	Building.	Ornamental and Monu- mental.	Paving and Curb- stone.	Rubble.	Crushed.	Furnace Flux.	Total.
	\$	\$	\$	\$	\$	\$	\$
Granite.....	159,470	73,611	106,963	63,205	51,575	.....	454,824
Limestone....	666,324	95,457	154,490	210,418	609,349	403,613	2,139,691
Marble.....	20,000	135,780	.....	2,661	.....	.....	158,441
Sandstone.....	324,716	1,490	17,774	26,836	3,363	.....	374,179
Totals....	1,170,550	306,338	279,227	303,120	664,287	403,613	3,127,135

*Exports and Imports.*—The exports of stone are classified simply as wrought and unwrought; the total value of the exports in 1909 was \$59,370, as compared with \$58,005 in 1908.

The annual exports given since 1890 are shown in the following table:—

**Exports of Stone and Marble, Wrought and Unwrought.**

Calendar Year.	Wrought.	Unwrought.	Calendar Year.	Wrought.	Unwrought.
	\$	\$		\$	\$
1890.....	21,725	43,611	1900.....	5,933	115,711
1891.....	13,393	46,162	1901.....	5,917	157,739
1892.....	7,698	47,424	1902.....	8,632	124,829
1893.....	9,102	12,532	1903.....	7,684	46,295
1894.....	22,576	34,130	1904.....	4,760	17,802
1895.....	8,587	51,616	1905.....	3,545	13,089
1896.....	4,934	32,897	1906.....	23,097	4,675
1897.....	9,415	42,034	1907.....	4,233	3,087
1898.....	2,526	65,370	1908.....	15,194	42,811
1899.....	5,092	101,931	1909.....	33,598	25,772

The imports are classified as building stone of all kinds except marble, manufactures of granite and other stone, and marble and its manufactures. The total value of the imports of stone during the calendar year 1909 was \$683,801, the imports during the fiscal year ending March were \$531,822; as compared with a value of \$651,525 during the fiscal year 1908.

Of the imports during the calendar year 1909, \$280,557 in value was classed as building stone; \$132,298 as granite, sawn and manufactures of; \$58,355 as paving blocks, and \$182,147 as marble and manufactures of. Details of the imports of the calendar year 1909 and the fiscal years 1908 and 1909, and of the annual imports since 1880, are shown in accompanying tables.

The imports during 1909 were derived chiefly from the United States and Great Britain; the United States supplying building stone, paving blocks, and marble principally. The imports from Great Britain consisted mainly of manufactures of granite. Marble is obtained in some quantity from Italy also.



## Total Imports of Stone during the Calendar Year 1909.

Imports.	Tons.	Value.
		\$
Building stone, rough (1).....	21,746	102,470
" dressed (2).....	35,910	178,087
Granite, sawn only.....	307	2,380
" mfgs. of.....		129,918
Paving blocks.....		58,355
Manufactures of stone, N.O.P.....		30,444
Marble and mfgs. of—		
Marble, sawn only.....		118,095
rough, not hammered or chiselled.....		8,414
manufactures of, N.O.P.....		55,638
		683,801

(1) Flagstones, granite, rough freestone, sandstone, and all building stone not hammered or chiselled.

(2) Flagstone and all other building stone, sawn or dressed.

## Imports of Stone, showing Country of Origin, Calendar Year 1909.

Imports of.	Great Britain.		United States.		Italy.	Other Countries.
	Tons.	Value.	Tons.	Value.	Value.	Value.
		\$		\$	\$	\$
Building stone, rough (1).....	506	2,048	21,115	99,933		489
" dressed (2).....	144	987	35,766	177,100		
Granite, sawn only.....	120	802	187	1,578		
" mfgs. of.....		121,983		7,921		14
Paving blocks.....				58,355		
Manufactures of stone, N.O.P.....		3,374		24,316		2,754
Marble and mfgs. of—						
Marble, sawn only.....		2,275		85,656	29,071	1,093
rough, not hammered						
or chiselled.....				8,414		
manufactures of, N.O.P.....		1,393		53,092		1,153
		132,862		516,365	29,071	5,503

(1) Flagstones, granite, rough freestone, sandstone, and all building stone not hammered or chiselled.

(2) Flagstone and all other building stone, sawn or dressed.

## Imports of Stone, Fiscal Years 1908 and 1909.

Imports.	1908.		1909.	
	Tons.	Value.	Tons.	Value.
		\$		\$
Building stone, rough (1) .....	19,344	80,950	14,011	63,984
" dressed (2) .....	17,166	90,740	16,841	72,961
Granite, sawn only .....	1,019	5,450	302	2,756
" mfgs. of .....		119,881		123,155
Paving blocks .....		32,566		42,420
Manufactures of stone, N.O.P. .....		34,851		25,618
Marble and mfgs. of—				
Marble, sawn only .....		155,668		108,522
" rough, not hammered or chiselled.		5,319		9,138
" manufactures of, N.O.P .....		126,600		63,268
		651,525		831,822

(1) Flagstones, granite, rough freestone, sandstone, and all building stone not hammered or chiselled.

(2) Flagstone and all other building stone, sawn or dressed.

## Annual Imports of Stone.

Fiscal Year.	BUILDING STONE.		Manufac- tures of Granite, etc.	Marble.	Flagstones.	Total Value.
	Rough.	Dressed.				
	\$	\$	\$	\$	\$	\$
1880.....	32,824	3,146	29,408	63,015	.....	128,393
1881.....	7,823	50,326	36,877	85,977	241	181,244
1882.....	32,848	775	37,267	109,505	848	181,243
1883.....	33,429	1,632	45,636	128,520	99	209,316
1884.....	46,232	4,856	45,290	108,771	1,158	206,307
1885.....	28,433	2,058	39,867	102,835	1,756	174,949
1886.....	36,776	4,899	41,984	117,752	9,443	210,854
1887.....	47,819	6,549	41,829	104,250	10,966	211,413
1888.....	84,263	2,110	47,487	94,681	21,077	243,618
1889.....	89,723	10,591	61,341	118,421	15,451	295,527
1890.....	126,456	5,699	84,396	99,353	48,995	364,899
1891.....	151,119	19,771	61,051	107,661	36,348	372,950
1892.....	85,169	10,381	39,479	106,268	15,048	256,345
1893.....	47,609	8,901	49,323	96,177	8,500	210,510
1894.....	48,097	4,811	49,510	94,657	2,429	149,504
1895.....	37,732	6,550	51,050	83,422	84	178,838
1896.....	42,737	11,393	51,499	90,065	Nil	195,694
1897.....	27,442	11,272	34,026	77,150	227	150,117
1898.....	25,322	3,173	41,240	95,894	1,540	167,129
1899.....	43,494	4,546	60,148	104,879	Nil	210,067
1900.....	63,376	1,157	57,039	94,017	63	215,652
1901.....	45,039	1,039	66,639	96,159	116	208,992
1902.....	69,972	29,102	72,397	130,424	1,231	303,126
1903.....	71,202	16,664	78,629	153,481	Nil	319,976
1904.....	59,864	33,914	141,165	181,511	Nil	416,454
1905.....	49,004	53,813	150,160	145,466	Nil	398,443
1906.....	66,994	65,134	178,435	189,589	Nil	500,152
1907.....	58,398	78,967	136,779	176,450	Nil	450,594
1908.....	80,950	90,740	192,248	287,587	Nil	651,525
1909.....	63,984	72,961	193,949	200,928	Nil	531,822

## GRANITE.

Granite is produced largely for building, monumental, and paving purpose, and the main centres of production for 1909 were in Quebec and British Columbia, although Ontario and New Brunswick are also important producers.

The total value of the production in 1909 was \$454,824, as compared with a production in 1908 of \$282,320, and in 1907 of \$194,712.

Statistics of the production by provinces, showing the purpose for which the stone was sold, and the annual total production since 1886, are shown in the following tables.

Value of Granite Production by Provinces, 1909.

Province.	Building.	Monumental or Ornamental.	Curb, or Paving.	Rubble.	Crushed.	Total.
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	458	2,528	2,846			5,832
New Brunswick.....	3,378	7,038	450	675		11,541
Quebec.....	139,634	58,845	56,167	20	2,430	257,096
Ontario.....		2,700	36,500		3,500	42,700
Manitoba.....					3,345	3,345
British Columbia.....	16,000	2,500	11,000	62,510	44,300	134,310
Total.....	159,470	73,611	106,963	63,205	51,575	454,824

Annual Production of Granite.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	6,062	63,309	1898.....	23,897	81,073
1887.....	21,217	142,506	1899.....	13,418	90,542
1888.....	21,352	147,305	1900.....		80,000
1889.....	10,197	79,624	1901.....		155,000
1890.....	13,307	65,985	1902.....		210,000
1891.....	13,637	70,056	1903.....		200,000
1892.....	24,302	89,326	1904.....		150,000
1893.....	22,521	94,393	1905.....		226,305
1894.....	16,392	109,936	1906.....		278,419
1895.....	19,238	84,838	1907.....	15,136	194,712
1896.....	18,717	106,709	1908.....		282,320
1897.....	19,345	61,934	1909.....		454,824

## LIMESTONE.

No record has been obtained of the stone used for burning for lime or for making cement, the value of these manufactured products being separately tabulated. With these exceptions then, the total production of limestone in Canada in 1909 was valued at \$2,139,691, of which, stone to the value of \$761,821 was used for

building and ornamental purposes. The value of crushed stone sold was \$609,349; curbstone and paving stone, \$154,490; rubble, \$210,418. For use as a furnace flux there was sold 842,232 tons valued at \$403,613.

There is no separate record of the production of limestone in 1908 or previous years.

### Value of Limestone Production by Provinces, 1909.

Province.	Building and Orn- amental.	Crushed.	Curbstone and Paving.	Rubble.	Furnace Flux.		Total.
	\$	\$	\$	\$	Tons.	\$	\$
Nova Scotia.....	2,025				319,795	159,897	161,922
New Brunswick.....	30						30
Quebec.....	456,338	257,185	154,259	94,221	20,500	10,250	972,253
Ontario.....	78,823	297,589	169	66,885	427,422	196,208	639,674
Manitoba.....	224,605	54,575	62	49,312			328,554
British Columbia.....					74,515	37,258	37,258
Total.....	761,821	609,349	154,490	210,418	842,232	403,613	2,139,691

*Nova Scotia.*—The value of the limestone quarried in this Province in 1909 was returned as \$161,922, of which the greater part was quarried at Marble Mountain and Point Edward, C.B., and used in the blast furnaces and steel plants of the Province.

*Quebec.*—The value of the limestone produced in 1909 was \$972,253, of which about 80 per cent was quarried on the Island of Montreal. There is also an important production in Portneuf county and in the City of Hull, in Ottawa county; smaller operations being carried on in the counties of Vercheres, St. Johns, and Terrebonne.

About 46·9 per cent of the production was returned as for building purposes, etc.; 15·8 per cent for curbstone and paving; 9·7 per cent for rubble stone; and 26·5 per cent for crushed stone, and a small quantity used as furnace flux.

*Ontario.*—The production of limestone in Ontario, according to returns received, was valued at \$639,674.<sup>1</sup> This figure is, however, an underestimate, owing to the non-receipt of returns from a number of known producers. Crushed stone was valued at \$297,589; rubble at \$66,885; building and ornamental stone, \$78,823. There was also produced 427,422 tons of stone valued at \$196,208, and so'd for furnace flux.

The largest operated quarries are found in the counties lying about the western end of Lake Ontario, including Halton, Wentworth, Lincoln, Welland, and Haldimand.

*Manitoba.*—Limestone quarries are operated in the vicinity of Tyndall, 30 miles northeast of Winnipeg, and at Stony Mountain, Stonewall, Rockspur, and

<sup>1</sup> Additional returns received since completing the statistics have increased the total to \$694,674, the increase being crushed stone and rubble.

Gunton on the Canadian Pacific railway, Teulon Branch, from 12 to 25 miles north of Winnipeg.

*British Columbia.*—The Consolidated Mining and Smelting Company operate a quarry at Fife on the Canadian Pacific railway, Boundary division, to supply flux for the Trail smelter.

### MARBLE.

The value of the marble production in 1909 has been returned as \$158,441. Complete statistics of the 1908 production were not received, but the total value of the finished stone produced was estimated at not less than \$125,000. Marble quarries were operated at Philipsburg, Que.; at Tatlock, in Lanark county, and in Hungerford township, Hastings county, Ontario; and near Lardo, head of Kootenay lake, British Columbia.

The value of the Quebec production was \$130,000; Ontario \$3,441, and British Columbia, \$25,000. With the exception of a small quantity used as crushed marble, the entire output was employed for building, ornamental, and decorative purposes. There has been only a spasmodic production of marble in Canada in past years, and from 1897 to 1907 there was no production whatever reported.

#### Annual Production of Marble.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	501	9,900	1893.....	590	5,100
1887.....	242	6,224	1894.....	Nil.	Nil.
1888.....	191	3,100	1895.....	200	2,000
1889.....	83	980	1896.....	224	2,405
1890.....	780	10,776	1897 to 1907 inclusive....	Nil.	Nil.
1891.....	240	1,752	1908.....		125,000
1892.....	340	3,600	1909.....		158,441

The most successful operations being carried on at present are at the quarries at Philipsburg, Quebec, operated by the Missisquoi Marble Company, Ltd., of Montreal. The quarry is provided with channeling machinery, steam drills, and derricks; while the mill and finishing shops contain gang saws, planer, lathe, polishing machinery, pneumatic tools, etc. The marble is in considerable demand as a decorative stone, and finds a market throughout Canada, from Prince Edward Island to Vancouver, and is also exported to the United States. During 1909 the Company installed additional equipment with the expectation of being able to double their output.

In Ontario the operations were practically in the initial stages of development, and the output consequently small.



The same was true also, to a large extent, of the British Columbia quarries, the production being merely incidental to development.

### SANDSTONE.

The total value of sandstone produced in Canada in 1909 was \$374,179 ; of which stone to the value of \$168,513, or 45·1 per cent, was quarried in British Columbia. The production in Alberta was valued at \$90,383, or 24·1 per cent of the total. Ontario was credited with \$62,824, and the Maritime Provinces with \$52,459. The production was chiefly used for building purposes, the stone being also used for paving purposes and rubble. There is no complete record of the sandstone production throughout Canada in previous years.

Value of Sandstone Production by Provinces, 1909.

Province.	Building and Orna- mental.	Crushed.	Paving.	Rubble.	Total.
	\$	\$	\$	\$	\$
Nova Scotia.....	15,050	800	.....	6,000	21,850
New Brunswick.....	25,784	.....	.....	4,825	30,609
Ontario.....	29,584	2,563	17,774	12,903	62,824
Alberta.....	87,450	.....	.....	2,933	90,383
British Columbia.....	168,338	.....	.....	175	168,513
Total.....	326,206	3,363	17,774	26,836	374,179

The Maritime Provinces have in past years been large producers of sandstone or freestone, large quantities being at one time exported to the United States. At the present time the principal quarries are situated at Wallace, Sackville, Renous Bridge, etc.

The Ontario production was derived from Georgetown, Halton county, and Nepean township, Carleton county.

In Alberta, sandstone is quarried at Glenbow, 18 miles west of Calgary ; Brickburn, 5 miles west of Calgary ; and at Novar, about 16 miles north-east of McLeod.

Sandstone was quarried in British Columbia on Saturna, Haddington, and Gabriola islands.

# CANADA

## DEPARTMENT OF MINES

### MINES BRANCH

HON. W. TEMPLEMAN, MINISTER; A. P. LOW, LL.D., DEPUTY MINISTER;  
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CANADA  
DEPARTMENT OF MINES

MINES BRANCH

HON. W. B. NANTSEL, MINISTER; A. P. LOW, LL.D., DEPUTY MINISTER;  
EUGENE HAANEL, PH.D., DIRECTOR.

ANNUAL REPORT

ON THE

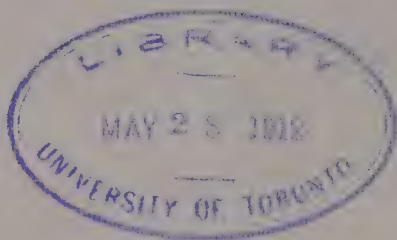
MINERAL PRODUCTION OF CANADA

During the Calendar Year

1910

JOHN McLEISH, B.A.

*Chief of the Division of Mineral Resources and Statistics.*



OTTAWA  
GOVERNMENT PRINTING BUREAU

1912

No. 143



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## LETTER OF TRANSMITTAL.

DR. EUGENE HAANEL,

Director of Mines,

Department of Mines, Ottawa.

SIR,—I beg to hand you herewith, the Annual Report of the Division of Mineral Resources and Statistics, giving revised statistical information descriptive of the mining and metallurgical production in Canada during the calendar year, 1910.

A preliminary report on the mineral production during 1910 was sent to press February 23, 1911, and issued within the following week. As evidence of the approximate completeness of this preliminary statistical report, it may be stated that the total value of the mineral production in Canada during 1910, as shown in the revised statistics herewith, differs by only 1.6 per cent from the total as published in the first report.

Parts of the present report—including a “General Summary of the Mineral Production in Canada during 1910,” “Report on the Production of Iron and Steel in Canada during 1910,” “Report on the Production of Coal and Coke in Canada during 1910,” and “Report on the Production of Cement, Lime, Clay Products, Stone and other Structural Materials in Canada during 1910”—have already been published as separate bulletins.

In the preparation of this report Mr. Cosmo T. Cartwright has devoted special attention to the metalliferous subjects, particularly gold, silver, copper, lead and zinc, while Mr. J. Casey has given particular care to the compilation of the statistics.

Free use has been made of the reports published by the Provincial Bureaus of Mines; and grateful acknowledgement is made of the hearty co-operation of mine and smelter operators who have, with few exceptions, cheerfully complied with our requests, and furnished the department with statistics and information regarding their operations.

I have the honour to be, sir,

Your obedient servant,

(Signed.) John McLeish.

DIVISION OF MINERAL RESOURCES AND STATISTICS,

October 25, 1911.



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## EXPLANATORY NOTES.

The term 'ton' used throughout this report signifies a ton of 2,000 pounds; while the year referred to means calendar year, unless otherwise stated. The government fiscal year formerly ended on the 30th of June; but now terminates on the 31st of March. This change took place in 1907, hence the fiscal period ending March 31, 1907, covers only nine months.

Statistics of exports and imports given throughout this report are compiled from the reports of Trade and Navigation published by the Customs Department.

The term 'production' used throughout this report may in general be interpreted as meaning the quantity sold or shipped. Mineral products mined or manufactured, but not sold or shipped, at the end of the year, are not included as 'production.' An exception to this usage will be found in reference to pig iron, in which case the statistics of production represent the quantities made.

The value of the metallic minerals produced, whether refined in Canada or not, is calculated on the basis of the average price of the metal in some recognized market. New York prices have usually been taken as the standard. In the case of lead, however, the New York price is so much higher than that of London, that the Toronto price—about midway between these two—has been used during the past two years. The value of non-metallic products is given as at the mine or point of shipment.





# THE MINERAL PRODUCTION OF CANADA

During the Calendar Year

1910.

## General Summary.

The total value of the mineral production in Canada in 1910, according to revised statistics now complete, was \$106,823,623: a value slightly greater than the estimate of production published on the 1st of March. Compared with the previous year's production of \$91,831,441, that of 1910 shows an increase of \$14,992,182, or 16 per cent, and is the largest increase that has been recorded in Canada's mineral production in any one year. The production per capita has also increased from \$12.82 in 1909, to \$14.26 in 1910, an advance of 11.2 per cent. The largest production per capita previously recorded was \$13.35 in 1907.

The year 1886 was the first year for which complete statistics of mineral production for the whole of Canada were collected by this Department, and the production that year was reported as \$10,221,255, or about \$2.23 per capita. In ten years the production had increased over 100 per cent, to \$22,474,256, or \$4.38 per capita, in 1896. At this time, the Yukon began to contribute largely to the gold production, and, during the next five years, an increase of nearly 200 per cent is shown, the total reaching a value of \$65,797,911, or \$12.25 per capita in 1901. The next three years witnessed a slight falling off, but from 1904 the production again rapidly increased to its present high record.

## Annual Mineral Production in Canada since 1886.

Year.	Value. of Production.	Value per Capita.	Year.	Value of Production.	Value per Capita.
	\$	\$ cts.		\$	\$ cts.
1886.....	10,221,255	2 23	1899.....	49,234,005	9 27
1887.....	10,321,331	2 23	1900.....	64,420,877	12 04
1888.....	12,518,894	2 67	1901.....	65,797,911	12 25
1889.....	14,013,113	2 96	1902.....	63,231,836	11 55
1890.....	16,763,353	3 50	1903.....	61,740,513	11 03
1891.....	18,976,616	3 92	1904.....	60,082,771	10 36
1892.....	16,623,415	3 39	1905.....	69,078,999	11 35
1893.....	20,035,082	4 04	1906.....	79,286,697	12 55
1894.....	19,931,158	3 98	1907.....	86,865,202	13 35
1895.....	20,505,917	4 05	1908.....	85,557,101	12 32
1896.....	22,474,256	4 38	1909.....	91,831,441	12 82
1897.....	28,485,023	5 49	1910.....	106,823,623	14 26
1898.....	38,412,431	7 32			

## Comparative Statement of Mineral

		1909.		
No.	Product.	Quantity.	Value. (a)	Per cent of total.
<i>Metallic.</i>			\$	%
1	Antimony ore..... Tons.	35	1,575	
2	“ refined..... Lbs.	61,207	4,285	
3	Cobalt (i)..... “		94,609	0.10
4	Copper (b)..... “	52,493,863	6,814,754	7.42
5	Gold..... Ozs.	453,865	9,382,230	10.21
6	Pig iron from Canadian ore (c)..... Tons.	149,444	2,222,215	2.41
7	Iron ore (exports)..... “	21,965	61,954	
8	Lead (d)..... Lbs.	45,857,424	1,692,139	1.84
9	Nickel (e)..... “	26,282,991	9,461,877	10.30
10	Silver (f)..... Ozs.	27,529,473	14,178,504	15.43
11	Zinc ore..... Tons.	18,371	242,699	0.26
Total.....			44,156,841	48.08
<i>Non-Metallic.</i>				
12	Actinolite..... Tons.		67,446	
13	Arsenic..... “		2,284,587	2.48
14	Asbestos..... “	63,349	17,188	
15	Asbestic..... “	23,951	26,604	
16	Chromite..... “	2,470	24,781,236	26.93
17	Coal..... “	10,501,475	162,492	0.17
18	Corundum..... “	1,491	40,383	
19	Feldspar..... “	12,783		
20	Fluorspar..... “			
21	Graphite..... “	864	47,800	
22	“ artificial..... “	257		
23	Grindstones..... “	4,275	54,664	
24	Gypsum..... “	473,129	809,632	0.88
25	Magnetite..... “	330	2,508	
26	Mica..... “	369	147,782	0.16
Mineral pigments—				
27	Barytes..... “	179	1,120	
28	Ochres..... “	3,940	28,093	
29	Mineral water.....		175,173	0.19
30	Natural gas (g).....		1,207,029	1.31
31	Peat..... “	60	240	
32	Petroleum (h)..... Bls.	420,755	559,604	0.60
33	Phosphate..... Tons.	998	8,054	
34	Pyrites..... “	64,644	222,812	0.24
35	Quartz..... “	56,924	71,285	
36	Salt..... “	84,037	415,219	0.45
37	Talc..... “	4,350	10,300	
38	Tripolite..... “			
Total.....			31,141,251	33.91

\* Short tons throughout.

(a) The metals copper, lead, nickel, and silver are for statistical and comparative purposes valued at the final average value of the refined metal. Pig iron is valued at the furnace, and non-metallic products at the mine or point of shipment.

(b) Copper content of smelter products and estimated recoveries from ores exported, at 12.982 cents per pound, in 1909; and 12.738 cents per pound in 1910.

(c) The total production of pig iron in Canada in 1909 was 757,162 tons valued at \$9,581,864, of which it is estimated 607,718 tons valued at \$7,359,649 should be credited to imported ores; in 1910, the total production was 800,797 tons valued at \$11,245,622, of which 695,891 tons valued at \$9,594,773 are credited to imported ores.

(d) Refined lead and lead contained in base bullion exported at 3.692 cents per pound, in 1909; and 3.687 cents in 1910, the average prices in Toronto.

## Production for Years 1909 and 1910.

1910.			Increase (+) or Decrease (-).		Increase (+) or Decrease (-).		No.
Quantity.	Value (a).	Per cent of total.	Quantity.	%	Value.	%	
	\$	%			\$		
364	13,906		+	329	+	12,331	1
			-	61,207	-	4,285	2
	51,986				-	42,623	3
55,692,369	7,094,094	6.64	+	3,198,506	+	279,340	4
493,707	10,205,835	9.55	+	39,842	+	823,605	5
104,906	1,650,849	1.54	-	44,538	+	571,366	6
114,449	324,186	0.30	-	92,493	+	262,232	7
32,987,508	1,216,249	1.13	-	12,869,916	+	475,890	8
37,271,033	11,181,310	10.46	+	10,988,042	+	1,719,433	9
32,869,264	17,580,455	16.45	+	5,339,791	+	3,401,951	10
5,063	120,003	0.11	-	13,308	-	122,696	11
	49,438,873	46.28			+	5,282,032	
30	330		+	30	+	330	12
2,049	81,044		+		+	13,598	13
77,508	2,555,974	2.39	+	14,159	+	271,387	14
24,707	17,629		+	756	+	441	15
299	3,734		-	2,171	-	22,870	16
12,909,152	30,909,779	28.93	+	2,407,677	+	6,128,543	17
1,870	198,680	0.18	+	379	+	36,188	18
15,809	47,667		+	3,026	+	7,284	19
2	15		+	2	+	15	20
1,392	74,087		+	528	+	26,287	21
1,221			+	964	+		22
3,973	47,196		+	302	-	7,468	23
525,246	934,446	0.87	+	52,117	+	124,814	24
323	2,160		-	7	-	348	25
	190,385	0.17			+	42,603	26
0	0		-	179	-	1,120	27
4,813	33,185		+	873	+	5,092	28
	199,563	0.18			+	24,390	29
	1,346,471	1.26			+	139,442	30
841	2,604		+	781	+	2,364	31
315,895	388,550	0.36	-	104,860	-	171,054	32
1,478	12,578		+	480	+	4,524	33
53,870	187,064	0.17	+	10,774	-	35,748	34
88,205	91,951		+	31,281	+	20,666	35
84,092	409,624	0.38	+	55	-	5,595	36
7,112	22,308		+	2,762	+	12,008	37
22	134		+	22	+	134	38
	37,757,158	35.34			+	6,615,907	

(e) Nickel content of matte produced valued at 36 cents per pound in 1909; and at 30 cents in 1910. (Increasing quantities of nickel-copper matte are now being used in making monel metal which is sold at a price much below that of refined nickel.) The value of the nickel contained in matte, as returned by the operators, was about 10 cents per pound for both years.

(f) Estimated recoverable silver at 51-503 cents per ounce in 1909; and at 53-486 cents in 1910.

(g) Gross returns for sale of gas.

(h) Quantity on which bounty was paid and valued at \$1.33 per barrel in 1909 and at \$1.23 in 1910.

(i) Value received by shippers of silver cobalt ores for cobalt content.

## Comparative Statement of Mineral

No.	Product.	1909.		
		Quantity.	Value.	Per cent of total.
	<i>Structural Materials and Clay Products.</i>		\$	%
39	Cement, Portland..... Bls.	4,067,709	5,345,802	5.82
	Clay products—			
40	Brick, common..... No.	539,228,708	4,212,424	4.58
41	Brick, pressed..... “	57,264,656	630,677	0.68
42	Brick, paving..... “	3,759,803	67,408	.....
43	Brick, moulded and ornamental.....	.....	8,866	.....
44	Fireclay, and fireclay products.....	.....	78,132	.....
45	Fireproofing and architectural terra-cotta.....	.....	113,886	0.12
46	Pottery.....	.....	285,285	0.31
47	Sewer-pipe.....	.....	645,722	0.70
48	Tile, drain..... No.	27,571,097	408,440	0.44
49	Lime..... Bus.	5,592,924	1,132,756	1.23
50	Sand-lime brick..... No.	27,052,864	201,650	0.21
51	Sand and gravel (exports)..... Tons.	481,584	256,166	0.27
52	Slate..... Squares.	4,000	19,000	.....
	Stone—			
53	Granite.....	.....	454,824	0.49
54	Limestone.....	.....	2,139,691	2.33
55	Marble.....	.....	158,441	0.17
56	Sandstone.....	.....	374,179	0.40
	Total.....	.....	16,533,349	18.00
	Grand total.....	.....	91,831,441	100.00



## Production for Years 1909 and 1910—Continued.

1910.			Increase (+) or Decrease (-).		Increase (+) or Decrease (-).		No.
Quantity.	Value. (a)	Per cent of total.	Quantity.	%	Value.	%	
	\$	%			\$		
4,753,975	6,412,215	6.00	+ 686,266	16.87	+ 1,066,413	19.95	39
627,715,319	5,105,354	4.77	+ 88,486,611	16.41	+ 892,930	21.19	40
67,895,034	807,294	0.75	+ 10,630,378	18.56	+ 176,617	28.00	41
4,214,917	78,980	.....	+ 457,114	12.16	+ 11,572	17.17	42
703,345	16,092	.....	.....	.....	+ 7,226	81.50	43
.....	50,215	.....	.....	.....	+ 27,917	35.73	44
.....	176,979	0.16	.....	.....	+ 63,093	55.40	45
.....	250,924	0.23	.....	.....	+ 34,361	12.04	46
.....	774,110	0.72	.....	.....	+ 128,388	19.88	47
24,562,648	370,008	0.34	- 3,008,449	10.91	- 38,432	9.41	48
5,848,146	1,137,079	1.06	+ 255,222	4.56	+ 4,323	0.38	49
44,593,541	371,857	0.34	+ 17,540,677	64.84	+ 170,207	84.41	50
624,824	407,974	0.38	+ 143,240	29.74	+ 151,808	59.26	51
3,959	18,492	.....	- 41	1.03	- 508	2.67	52
.....	739,516	0.69	.....	.....	+ 284,692	62.59	53
.....	2,249,576	2.10	.....	.....	+ 109,885	5.14	54
.....	158,779	0.14	.....	.....	+ 338	0.21	55
.....	502,148	0.47	.....	.....	+ 127,969	34.20	56
.....	19,627,592	18.37	.....	.....	+ 3,094,243	18.72	.....
.....	106,823,623	100.00	.....	.....	+ 14,992,182	16.33	.....

The production of metalliferous products in 1910 was valued at \$49,438,873, being 46 per cent of the total mineral output; and an increase in value over the previous year of \$5,282,032, or nearly 12 per cent. The value of non-metalliferous products (excluding structural material and clays) in 1910 was \$37,757,158, being 35 per cent of the total mineral output; and an increase of \$6,615,907, or 21 per cent, in value over 1909. The value of the production of clay, lime and stone, and other structural materials in 1910 was \$19,627,592, or 18 per cent of the total production; and an increase of \$3,094,243 over the 1909 output.

Amongst the more important minerals mined, coal occupied first place, contributing about 29 per cent of the total production; silver, next in importance, contributed over 16 per cent of the total; nickel was next in order with over 10 per cent; while gold occupied fourth place with  $9\frac{1}{2}$  per cent of the total; clay products contributed 7 per cent; copper 6.6 per cent; cement 6 per cent.

The increased production was not confined to a few products, but was, on the other hand, fairly well distributed throughout the list of ores and minerals mined in Canada. Amongst the metallic products the principal increases were in silver, nickel, gold, and copper; there being a falling off in the production of lead and of zinc. There was an increased production of pig iron from blast furnaces, but a smaller amount credited to Canadian iron ore.

The prices of metals upon which the value of the production directly depends did not vary greatly during the year, nor did the averages differ much from those of the previous year. Lead, silver, and zinc averaged higher in price in 1910, while copper was fractionally lower and nickel remained practically at the same price level.

—	1906.	1907.	1908.	1909.	1910.
	Cts.	Cts.	Cts.	Cts.	Cts.
Copper, New York.....	19.278	20.004	13.208	12.982	12.738
Lead ".....	5.657	5.325	4.200	4.273	4.446
" Toronto.....	4.727	5.429	3.894	3.692	3.687
Nickel, New York.....	41.64	45.000	43.000	40.000	40.000
Silver ".....	66.791	65.327	52.864	51.503	53.486
Spelter ".....	6.198	5.962	4.720	5.503	5.520
Tin ".....	39.819	38.166	29.465	29.725	34.123

Quotations from *Hardware and Metal* and *Engineering and Mining Journal*.

Among the non-metallic products the principal increases were in coal, asbestos, natural gas, and gypsum; while the falling off in production of crude petroleum was quite marked. The structural materials and clay products nearly all showed substantial increases.

## EXPORTS AND IMPORTS.

A very large portion of the mineral production of Canada is exported for refining and manufacturing in the United States and other countries; while considerable quantities of mine products which have been refined or subjected

to partial treatment, or in the form of manufactured goods ready for consumption, are imported.

The total value of the exports of products of the mine, including direct mine products and manufactures, in 1910 was \$51,856,862; as compared with \$47,442,001 in 1909. This value includes for 1910 mine products to the value of \$42,236,270 and manufactures valued at \$9,620,592. About 93 per cent of the value of the mine products exported is made up by silver, nickel, copper, gold, coal, and asbestos. Manufactured mine products consist chiefly of iron and steel goods; coke; and aluminium, made from imported ore.

The United States is the chief destination of Canada's mine exports, about 83 per cent having been exported to that country during the fiscal year 1909-1910, and about 9 per cent to Great Britain.

The imports of minerals and mineral products during the fiscal year 1909-1910 were valued at \$112,920,852. Of this amount about 46 per cent is made up of iron and steel goods; 26 per cent coal and coke; while the metals copper, silver, gold, platinum, lead, zinc, tin and manufactures thereof, and metallic alloys, make up a total value of \$12,528,746 or 11 per cent of the total, the balance being distributed among a great variety of mineral products.

The great excess of imports over exports of mineral products would appear to show that there is considerable opportunity in the development of our mineral resources to supply the demands of the home market. Also the large export of crude unrefined metal products and the corresponding imports of refined and manufactured metal products would seem to indicate opportunities for the further development of metallurgical industries as well as the treatment, refinement, and manufacture of non-metallic products.

### Exports of the Products of the Mine and of Manufactures of Mine Products— Calendar Years 1909 and 1910.

		1909.		1910.	
		Quantity.	Value.	Quantity.	Value.
			\$		\$
Arsenic.....	Lbs.	3,111,249	119,673	4,512,673	173,932
Asbestos.....	Tons.	56,971	1,729,857	71,485	2,108,632
Barytes.....	Cwt.			5	150
Chromite.....	Tons	1,794	20,858	15	150
Coal.....		1,588,099	4,456,342	2,377,049	6,077,350
Feldspar.....	"	10,834	35,234	15,601	47,962
Gold.....			5,629,549		5,491,051
Gypsum.....	Tons	315,201	372,286	346,081	416,725
Copper, fine, in ore, etc.....	Lbs.	54,447,750	5,832,246	56,964,127	5,840,553
Lead, in ore, etc.....	"	6,226,068	132,578	46,800	1,308
" in pig.....	"	11,301,960	361,064	7,712,253	248,174
Nickel, in ore, etc.....	"	25,616,398	2,676,483	36,014,782	4,039,040
Platinum in ore, concentrates.....	Ozs.	466	2,118	2,254	62,776
Silver in ore, etc.....	"	31,126,504	15,719,909	30,699,770	15,649,537
Mica.....	Lbs.	717,066	256,834	937,263	330,903
Carried forward.....			37,345,031		40,488,243

**Exports of the Products of the Mine and of Manufactures of Mine Products—  
Calendar Years 1909 and 1910—Continued.**

		1909.		1910.	
		Quantity.	Value.	Quantity.	Value.
			\$		\$
Brought forward.....			37,345,031		40,488,243
Mineral pigments.....	"	1,316,514	7,956	3,491,737	29,839
Mineral water.....	Gals.	60,562	7,433	16,136	7,169
Oil, refined.....	"	7,768	934	2,818	462
Ores—					
Antimony.....	Tons.	4	120	239	14,095
Iron.....	"	21,956	61,954	114,499	324,186
Manganese.....	"	3	434	4	160
Other ores.....	"	11,939	625,142	9,534	641,426
Phosphate.....	"	895	15,735		
Plumbago.....	Cwt.	20,070	52,438	15,768	53,008
Pyrites.....	Tons	35,798	156,644	30,434	110,071
Salt.....	Lbs.	276,765	2,488	275,200	2,618
Sand and gravel.....	Tons.	481,584	256,166	624,824	407,974
Slate.....	"	134	612		
Stone, ornamental.....	"	1,027	8,606	446	3,352
"    building.....	"	26,672	15,481	63,407	18,867
"    for mfg. of grindstones.....	"	125	1,685	308	338
Other products of the mine.....			109,350		134,462
Total, mine products.....			38,668,209		42,236,270
Manufactures—					
Agricultural implements—					
Mowing machines.....	No.	20,114	700,593	18,745	634,326
Reapers.....	"	4,504	270,452	3,411	220,517
Harvesters.....	"	12,316	1,239,597	11,382	1,234,794
Ploughs.....	"	11,924	301,878	16,888	540,677
Harrows.....	"	4,875	76,194	8,924	115,068
Hay forks.....	"	1	48		
Hay rakes.....	"	5,881	159,767	6,344	205,342
Seeders.....	"	159	11,983	256	13,727
Threshing machines.....	"			29	8,576
All other.....			1,010,776		1,163,722
Parts of.....			455,002		575,848
Brick.....	M.	365	2,255	390	2,762
Aluminium in bars, etc.....	Lbs.	6,134,500	918,195	77,224	1,160,242
"    manufactured.....			3,453		3,741
Cement.....			113,362		12,914
Clay, manufactures of.....			979		9,061
Coke.....	Tons.	74,067	329,051	57,971	250,715
Grindstones, manufactured.....			13,942		23,164
Gypsum, ground.....			2,787		12,306
Iron and steel—					
Stoves.....	No.	744	10,330	1,058	15,832
Castings, N.E.S.....			25,038		51,958
Pig iron.....	Tons.	5,063	186,778	9,763	296,310
Machinery (Linotype).....			43,686		39,438
"    N.E.S.....			421,707		301,961
Sewing machines.....	No.	12,759	147,402	17,834	188,196
Typewriters.....	"	3,749	238,167	5,970	409,326
Hardware, tools, etc.....			52,207		88,844
"    N.E.S.....			35,507		43,472
Scrap iron and steel.....	Cwt.	410,506	305,256	233,264	171,603
Steel and manufactures of.....			1,132,678		1,110,925
Lime.....			48,821		44,762
Metals, N.O.P.....			134,062		133,426
Plumbago, manufactures of.....			864		66,658
Stone, ornamental.....			33,097		5,272
"    building.....			501		80
Vehicles—					
Automobiles.....	No.	213	279,924	387	433,663
Bicycles.....	"	84	2,703	72	2,710
"    parts of.....			64,750		28,654
Total, manufactured products.....			8,773,792		9,620,592
Grand Total.....			47,442,001		51,856,862



## EXPORTS.

Showing Destination of Mine Products during the Fiscal Years  
1908-9 and 1909-10.

Destination.	1908-9. Value.	1909-10. Value.
	\$	\$
United States.....	31,260,862	33,488,464
Great Britain.....	2,986,967	3,820,574
China.....	595,683	777,147
Newfoundland.....	501,559	528,031
Mexico.....	170,797	325,153
Hong Kong.....	602,347	216,514
Australia.....	179,276	212,950
Japan.....	180,679	202,071
Belgium.....	209,640	177,675
France.....	67,921	110,222
Bermuda.....	41,426	53,071
Germany.....	337,316	43,975
St. Pierre.....	27,508	28,450
Holland.....		17,218
Cuba.....	11,428	14,946
West Indies.....	31,838	13,552
Italy.....	2,773	10,956
British Possessions (all other).....	4,779	10,903
New Zealand.....	19,441	8,518
Venezuela.....		6,383
Peru.....	12,328	5,187
Chili.....		4,950
Argentina.....	1,735	4,516
Cape Verde Islands.....		3,675
Austria-Hungary.....		1,030
Denmark.....		650
British Africa.....		97
Switzerland.....	310	73
Central American States.....		66
Dutch East Indies.....		
Bolivia.....	6,993	
British Guiana.....	4,016	
	77	
Totals.....	37,257,699	40,087,017



## IMPORTS.

## Minerals and Mineral Products, Fiscal Year 1909-10.

Products.	Value.
	\$
Alumina.....	322,566
Alum and alum cake.....	94,398
Aluminium.....	471,924
Antimony.....	34,728
Antimony salts.....	5,953
Arsenic.....	11,485
Asbestos.....	198,710
Asphaltum.....	396,627
Bells and gongs.....	95,422
Bismuth.....	9,029
Blanc fixe and satin white.....	14,735
Blast furnace slag.....	67,818
Borax.....	84,039
Brick and tile.....	821,856
Brick, fire.....	519,454
Burrstones.....	1,973
Cement.....	166,718
Chalk, etc.....	140,275
Clays.....	218,232
Coal.....	27,526,678
Coal tar and coal pitch.....	68,232
Coke.....	1,695,603
Copper and manufactures of.....	3,488,260
Cryolite.....	28,409
Crucibles, clay or plumbago.....	43,029
Chloride of lime.....	110,145
Earthenware.....	1,859,302
Electric carbons.....	205,025
Emery.....	102,019
Flint, quartz, etc.....	39,568
Fullers earth.....	5,611
Fossils.....	610
Gold and silver manufactures of.....	1,578,441
Graphite and manufactures of.....	56,968
Gypsum and plaster of Paris.....	153,504
Iron and steel—	
Pig iron.....	2,127,135
Ferro-silicon, etc.....	332,486
All other iron and steel.....	49,390,637
Kainite.....	7,254
Lead and manufactures of.....	463,905
Lime.....	116,964
Litharge.....	62,174
Lithographic stone.....	7,329
Manganese, oxide of.....	13,048
Magnesia.....	5,685
Marble and manufactures of.....	184,798
Mercury.....	146,914
Metallic alloys—	
Babbitt metal.....	30,349
Brass and manufactures of.....	2,027,826
Britannia metal.....	40,537
German silver, nickel, and nickel silver.....	154,964
Type metal.....	522
Mineral and bituminous substances.....	58,803
Mineral and metallic pigments.....	1,099,065
Mineral water, including aerated water.....	188,559
Nickel anodes.....	23,266
Ores of metals, N.O.P.....	3,345,550
Paraffin wax.....	27,296
Paraffin candles.....	20,842
Petroleum and products of.....	3,249,844
Phosphate (fertilizer).....	47,447
Platinum and manufactures of.....	84,435

## IMPORTS.

Minerals and Mineral Products, Fiscal Year 1909-10—*Continued.*

Products.	Value.
	\$
Precious stones.....	2,220,881
Pumice.....	12,047
Salt.....	465,253
Saltpetre.....	67,054
Sand and gravel.....	155,012
Slate and manufactures of.....	136,401
Stone and manufactures of.....	656,960
Sulphate of copper.....	78,177
Sulphate of iron.....	5,182
Sulphur and phosphorus.....	434,528
Sulphuric acid.....	8,466
Tin and manufactures of.....	3,826,390
Whiting.....	76,404
Zinc and manufactures of.....	883,117
Total.....	112,920,852

## METALLIC ORES AND PRODUCTS.

*Antimony.*—Shipments of antimony ore in 1910 were reported as 364 tons valued at \$13,906, as compared with 35 tons valued at \$1,575 in 1909. There was no production of refined antimony in 1910, while 61,207 pounds valued at \$4,285 were produced in 1909. The exports of antimony ore during 1910 were 239 tons valued at \$14,095. The imports of antimony or regulus thereof in 1910 were 388,952 pounds valued at \$25,296, and of antimony salts 94,330 pounds valued at \$9,152; or a total value of imports of \$34,448.

*Cobalt.*—Cobalt was recovered in the form of cobalt-oxide at two smelters in Ontario, but statistics of production are not available for publication. The mine owners reported the receipt of \$51,986 on account of cobalt content of ore shipped in 1910, as compared with \$94,609 recovered on the same account in 1909. Imports of cobalt-oxide are included with other metallic pigments and not separately stated.

*Copper.*—The production of copper contained in blister, matte, or ore which was practically all exported, was 55,692,369 pounds in 1910, as compared with 52,493,863 pounds in 1909; an increase of 3,198,506 pounds or 6 per cent.

The exports in 1910 were reported as 56,964,127 pounds valued at \$5,840,553, as against exports of 54,447,750 pounds valued at \$5,832,246 in 1909. The total imports of copper in 1910 were valued at \$4,369,773; and included crude and manufactured copper to the extent of 30,237,106 pounds valued at \$4,219,451, together with other copper manufactures valued at \$150,322 of which the quantity was not stated.

*Gold.*—The total value of the production of gold in 1910 was \$10,205,835: representing 493,707 fine ounces of metal, and showing an increase of \$823,605

or nearly 9 per cent over the production of 1909, which was valued at \$9,382,230 representing 453,865 fine ounces.

The Yukon placer production in 1910 was \$4,550,000, as against \$3,960,000 in 1909.

Of the total production in 1910 about \$5,091,850 are to be attributed to alluvial workings; \$680,349 derived from stamp milling; and \$4,433,628 obtained from ores and concentrates sent to smelters. In 1909, \$4,437,525 were credited to alluvial workings, \$572,619 derived from stamp milling and cyaniding, and \$4,371,914 obtained from ores and concentrates sent to smelters.

The exports of gold bearing dust quartz nuggets and gold in ore, etc., in 1910, were valued at \$5,491,051, as against \$5,629,549 in 1909.

The imports of gold coin during the fiscal year 1910 were \$4,998,236, and of gold bullion \$516,581.

*Pig Iron.*—The total production of pig iron in Canadian blast furnaces in 1910 was 800,797 tons valued at \$11,245,622, of which, for the purpose of bounty payment, 104,906 tons valued at \$1,650,849 were credited to Canadian ore and the balance to imported ore, mill cinder, etc. In 1909 the total production was 757,162 tons valued at \$9,581,864, of which 149,444 tons valued at \$2,222,215 were credited to Canadian ore.

The exports of pig iron, including ferro-products in 1910, were 9,763 tons valued at \$296,310, as against 5,063 tons valued at \$186,778 in 1909. The imports of pig iron in 1910 were 227,753 tons valued at \$3,122,695; charcoal pig iron 16,106 tons valued at \$242,152; and ferro-manganese, etc., 18,900 tons valued at \$464,741; as compared with imports in 1909 of: pig iron 147,925 tons valued at \$1,798,192; charcoal pig iron 413 tons valued at \$5,727; and ferro-manganese, etc., 17,699 tons valued at \$411,536.

The total exports of iron and steel and manufactures thereof in 1910 were valued at \$7,895,489; as against \$7,172,413 in 1909. The imports of iron and steel and manufactures during the fiscal year 1910 were valued at \$59,952,197, as compared with \$40,393,431 during the fiscal year 1909.

*Iron Ore.*—The total shipments of iron ore from Canadian mines in 1910 were 259,418 tons valued at \$574,362, as compared with 268,043 tons valued at \$659,316 in 1909. The exports of iron ore in 1910 were 114,449 tons valued at \$324,186, as against 21,965 tons valued at \$61,954 exported in 1909. The quantity of imported iron ore used in Canada in 1910 was about 1,377,035 tons, as compared with 1,235,000 tons of imported ore used in 1909.

*Lead.*—The production of lead in 1910 was 32,987,508 pounds valued at \$1,216,249, as against 45,857,424 pounds valued at \$1,692,139 in 1909; a decreased production of 12,869,916 pounds. The exports of lead in 1910 were: lead in ore, etc., 46,800 pounds; pig lead, 7,712,253 pounds—total 7,759,053 pounds; while in 1909 the exports were: lead in ore, etc., 6,226,068 pounds; pig lead, 11,301,960 pounds—total 17,528,028 pounds. The total value of the imports of lead and

manufactures of, in 1910, was \$689,002, as compared with imports in 1909 valued at \$510,949.

*Nickel.*—The production of nickel contained in nickel-copper matte produced in Canada and exported for refinement was, in 1910, 37,271,033 pounds, as compared with a production of 26,282,991 pounds in 1909; the increase in production being, therefore, 10,988,042 pounds or nearly 42 per cent. During 1910 there were smelted 628,947 tons of ore producing 35,033 tons of matte, as against 462,336 tons of ore smelted in 1909, producing 25,848 tons of matte. Small quantities of nickel oxide are also produced in connexion with the treatment of the Cobalt District silver ores, but statistics of production are not available for publication. The exports of nickel contained in ore, matte, etc., during 1910, were 36,014,782 pounds valued at \$4,039,040: being 5,335,331 pounds to Great Britain and 30,679,451 pounds to the United States. In 1909 the exports were 25,616,398 pounds valued at \$2,676,483: being 3,843,763 pounds to Great Britain and 21,772,635 pounds to the United States. The imports of nickel and nickel anodes in 1910 were valued at \$23,317.

*Silver.*—The production of silver contained in bullion, or estimated as recovered from mattes and ore, etc., exported was, in 1910, 32,869,264 fine ounces valued at \$17,580,455, as compared with a production of 27,529,473 fine ounces valued at \$14,178,504 in 1909; an increase of 5,339,791 ounces or over 19 per cent. About 92.4 per cent of the production in 1910 was derived from "Cobalt district" of Ontario. The production of silver in 1905 was only 6,000,023 ounces and in 1900, 4,468,225 ounces. The exports of silver contained in ores, mattes, etc., in 1910, were 30,699,770 ounces valued at \$15,649,537; as against exports of 31,126,504 ounces valued at \$15,719,909 in 1909. The imports of silver bullion during the fiscal year 1910 were valued at \$502,772, as compared with bullion imports of \$376,681 in 1909.

*Zinc.*—The shipments of zinc ore in 1910 were 5,063 tons valued at \$120,003, as compared with shipments of 18,371 tons valued at \$242,699 in 1909. The total value of the imports of zinc and manufactures of zinc, in 1910, was \$1,086,729, as compared with imports valued at \$1,040,770 in 1909.

#### NON-METALLIC PRODUCTS.

*Actinolite.*—A production of 30 tons valued at \$330 was reported in 1910; no returns of production being received for 1909.

*Arsenic.*—Returns from three smelters in which arsenic is recovered give a production in 1910 of 1,502 tons valued at \$75,328, as compared with 1,129 tons valued at \$64,100 in 1909. There were also 547 tons of arsenical ore shipped in 1910, valued at \$5,716, as compared with 224 tons valued at \$3,346 in 1909.

The exports of arsenic in 1910 were 2,256 tons valued at \$173,932, and in 1909, 1,556 tons valued at \$119,673. The imports of arsenious oxide, in 1910, were 260,415 pounds valued at \$6,891, and of sulphate of arsenic 257,451 pounds valued at \$8,946.



*Asbestos*.—The shipments of asbestos in 1910 were 77,508 tons valued at \$2,555,974, and of asbestic 24,707 tons valued at \$17,629. The shipments in 1909 were 63,349 tons of asbestos valued at \$2,284,587, and 23,951 tons of asbestic valued at \$17,188. The shipments in 1910 consisted of 3,740 tons of crude asbestos valued at \$664,508, and 73,768 tons of mill stock valued at \$1,891,466. Considerable quantities both of crude and of mill stock were held in manufacturers hands at the close of the year.

Exports in 1910 were 71,485 tons valued at \$2,108,632, as against 56,971 tons valued at \$1,729,857 in 1909.

Imports and manufactures of asbestos in 1910 were valued at \$230,489, and in 1909, \$196,742.

*Chromite*.—Shipments of chromite in 1910 were reported as 299 tons valued at \$3,734, as compared with shipments of 2,470 tons valued at \$26,604 in 1909.

*Coal*.—The production of coal in 1910 was 12,909,152 tons valued at \$30,909,779, as against 10,501,475 tons valued at \$24,781,236 in 1909; showing an increased production of 2,407,677 tons or nearly 23 per cent. The exports of coal in 1910 were 2,377,049 tons valued at \$6,077,350, as compared with 1,588,099 tons valued at \$4,456,342 exported in 1909. The total imports of coal in 1910 were 10,597,982 tons valued at \$28,450,001, as against imports in 1909 of 9,872,924 tons valued at \$26,831,859.

The 1910 imports included 5,966,466 tons of bituminous round and run of mine coal, valued at \$11,919,341; 3,266,235 tons of anthracite and anthracite dust, valued at \$14,735,062; and 1,365,281 tons of bituminous slack such as will pass through a  $\frac{3}{4}$ " screen valued at \$1,795,598.

In 1909 the imports included 5,625,063 tons of bituminous round and run of mine valued at \$11,455,818; 3,017,844 tons of anthracite and anthracite dust valued at \$13,906,152; and 1,230,017 tons of bituminous slack valued at \$1,469,889. The consumption of coal in 1910 was approximately 20,970,226 tons, as against 18,625,202 tons in 1909.

*Coke*.—The total quantity of oven coke made in 1910 was 901,269 tons, the quantity sold or used was 902,715 tons, valued at \$3,462,872; as compared with 871,727 tons made and 862,011 tons sold or used, valued at \$3,484,393, in 1909. The quantity of coal charged to coke ovens in 1910 was 1,373,793 tons, as against 1,327,150 tons in 1909. The exports of coke in 1910 were 57,971 tons valued at \$250,715, and in 1909, 74,067 tons valued at \$329,051. The imports of coke in 1910 were 737,088 tons valued at \$1,908,725, as compared with imports of 661,425 tons valued at \$1,508,627 in 1909.

*Corundum*.—The total sales of grain corundum in 1910 were 1,870 tons valued at \$198,680, as compared with sales in 1909 of 1,491 tons valued at \$162,492.

*Feldspar*.—Shipment increased from 12,783 tons valued at \$40,383 in 1909, to 15,809 tons valued at \$47,667 in 1910. The exports are recorded as 10,834 tons valued at \$35,234 in 1909, and 15,601 tons valued at \$47,962 in 1910.



*Fluorspar*.—A small production of fluorspar was reported in 1910, of which 2 tons valued at \$15 were shipped from the mine. About 7,461 tons of fluorspar were used during the year in steel plants.

*Graphite*.—Shipments of crude and milled graphite during 1910 totalled 1,392 tons valued at \$74,087, as against 864 tons valued at \$47,800 shipped in 1909. The production of artificial graphite in 1910 was reported as 1,221 tons, as compared with 257 tons in 1909.

Exports of plumbago in 1910 are reported as 788 tons valued at \$53,008, and manufactures of plumbago valued at \$66,658. Exports in 1909 were: plumbago, 1,004 tons valued at \$52,440, and manufactures of plumbago valued at \$864. Imports of graphite in 1910 were valued at \$112,853 and included: plumbago not ground, \$4,867; blacklead, \$10,048; plumbago ground and manufactures of, \$45,042; and crucibles of clay or plumbago, \$52,896. In 1909 the imports were valued at \$94,392, including: plumbago not ground, \$5,075; blacklead, \$11,638; plumbago ground and manufactures of, \$37,538; and crucibles of clay or plumbago, \$40,141.

*Grindstones*.—The production of grindstones, scythestones, and wood pulp-stones in 1910 was 3,973 tons valued at \$47,196, as compared with 4,275 tons valued at \$54,664 in 1909. The exports in 1910 included: stone for the manufacture of grindstones, 308 tons valued at \$338; and manufactured grindstones valued at \$23,164; the exports in 1909 were: stone for the manufacture of grindstones, 125 tons valued at \$1,685, and manufactured grindstones valued at \$13,942. The imports of abrasives in 1910 included: grindstones valued at \$71,394; burrstones, \$854; emery in bulk crushed or ground, \$40,400; manufactures of emery, carborundum, etc., \$92,890; pumice stone, \$14,829. The 1909 imports comprised: grindstones valued at \$69,554; burrstones, \$2,001; emery in bulk crushed or ground, \$29,752; manufactures of, \$66,777, and pumice stone, \$11,291.

*Gypsum*.—The total shipments of gypsum crude and calcined in 1910 were 525,246 tons valued at \$934,446, as compared with shipments of 473,129 tons valued at \$809,632 in 1909. The tonnage of gypsum mined or quarried in 1910 was 548,019 tons, and the quantity calcined, 69,889 tons. In 1909, 493,086 tons of gypsum were mined and 63,670 tons calcined. The shipments in 1910 included: crude gypsum, 469,573 tons valued at \$508,686; ground gypsum, 6,121 tons valued at \$17,390, and calcined gypsum 49,552 tons valued at \$408,370. In 1909 shipments comprised: crude gypsum, 423,474 tons valued at \$457,038; ground gypsum, 8,814 tons valued at \$26,159, and calcined gypsum, 40,841 tons valued at \$326,435. The exports of gypsum in 1910 were: 346,081 tons of crude gypsum valued at \$416,725, and gypsum ground or calcined valued at \$12,306. The 1909 exports were: 315,201 tons of crude gypsum valued at \$372,286, and gypsum ground or calcined valued at \$2,787.

The imports of gypsum in 1910 were valued at \$169,798, including: crude gypsum, 12,271 tons valued at \$21,073; ground gypsum, 6,690 tons valued at

\$13,242, and plaster of Paris, 19,045 tons valued at \$135,483. The total value of imports in 1909 was \$141,715, made up of: crude gypsum, 3,958 tons, valued at \$12,507; ground gypsum, 10,737 tons valued at \$16,779, and plaster of Paris, 19,116 tons valued at \$112,429.

*Magnesite.*—Shipments of magnesite in 1910 were 323 tons valued at \$2,160, and in 1909, 330 tons valued at \$2,508.

*Mica.*—The value of the mica production in 1910 as reported by mine operators was \$190,385, as compared with \$147,782 in 1909. The exports of mica in 1910 were 937,263 pounds valued at \$330,903, as against 717,066 pounds valued at \$256,834 in 1909.

*Mineral Pigments.*—Shipments of barytes in 1909 were 179 tons valued at \$1,120, and no production was reported in 1910. The production of iron ochres in 1910 was 4,813 tons valued at \$33,185, as compared with 3,940 tons valued at \$28,093 in 1909.

The exports of iron oxides in 1910 were 1,746 tons valued at \$29,839, as against 658 tons valued at \$7,956 in 1909. The imports in 1910 were: ochres and ochrey earth and raw siennas, 1,246 tons valued at \$31,926; and oxides, dry fillers, fireproof umbers, and burnt siennas, 868 tons valued at \$23,467. The total imports in 1909 were valued at \$39,497.

*Mineral Water.*—The value of the production of mineral water in 1910 for which returns were received was \$199,563, as compared with a value of \$175,173 in 1909. The imports of mineral and aerated waters in 1910 were valued at \$202,306, as against a value of \$184,071 in 1909.

*Natural Gas.*—The value of the production of natural gas in 1910 was \$1,346,471, as compared with a value of \$1,207,029 in 1909 and \$1,012,660 in 1908.

*Peat.*—Shipments of peat for fuel purposes in 1910 were 841 tons valued at \$2,604, as compared with 60 tons valued at \$240 in 1909.

*Petroleum.*—The production of crude petroleum shows another large falling off in 1910, the production being only 315,895 barrels or 11,056,337 gallons valued at \$388,550; as compared with 420,755 barrels or 14,726,433 gallons valued at \$559,604 in 1909.

Exports of refined oil in 1910 were 2,818 gallons valued at \$462, and 7,768 gallons valued at \$934 in 1909.

While the production has been decreasing the imports have been increasing; the total import of petroleum oils, crude and refined, in 1910 was 84,629,334 gallons valued at \$4,826,763, in addition to 1,362,235 pounds of wax and candles valued at \$80,106. The oil imports included: crude oil, 53,604,053 gallons valued at \$1,639,358; refined and illuminating oils, 7,656,727 gallons valued at \$502,364; gasoline, 16,679,691 gallons valued at \$1,693,296; lubricating oils, 4,081,257 gal-

ions valued at \$718,381, and other petroleum products, 2,607,606 gallons valued at \$273,364.

The total imports in 1909 were 58,317,101 gallons, valued at \$3,353,311, in addition to 467,731 pounds of wax and candles valued at \$40,689. The oil imports in 1909 included: crude oil, 35,884,103 gallons, valued at \$1,186,400; refined and illuminating oils, 9,632,595 gallons, valued at \$705,971; gasoline, 7,452,762 gallons, valued at \$706,994; lubricating oils, 3,909,117 gallons, valued at \$558,632, and other petroleum products, 2,038,524 gallons valued at \$195,314.

*Phosphate.*—Shipments of phosphate or apatite in 1910 were 1,478 tons valued at \$12,578, as compared with 998 tons valued at \$8,054 in 1909. There were no exports reported in 1910, as against 895 tons valued at \$15,735 in 1909. The imports of phosphate rock (fertilizer) in 1910 were valued at \$72,950; phosphorus, 6,752 pounds valued at \$2,065, and manufactured fertilizers valued at \$388,467.

*Pyrites.*—The production of pyrites in 1910 was 53,870 tons valued at \$187,064, as compared with 64,644 tons valued at \$222,812 in 1909. The exports of pyrites in 1910 were 30,434 tons valued at \$110,071, as against exports of 35,798 tons valued at \$156,644 in 1909. The imports of brimstone or sulphur in 1910 were 22,835 tons valued at \$474,619, as against 22,887 tons valued at \$458,961 in 1909.

*Quartz.*—The production of quartz in 1910 was reported as 88,205 tons valued at \$91,951, compared with a production in 1909 of 56,924 tons valued at \$71,285. There were imported during 1910, 628 tons of silex or crystallized quartz, valued at \$11,996, and, in 1909, 559 tons valued at \$8,733.

*Salt.*—The total sales of salt in 1910 were 84,092 tons valued at \$409,624 (exclusive of packages). The value of the packages used was \$173,446. In 1909 the sales were 84,037 tons valued at \$415,219, and value of packages used, \$175,612.

Exports of salt in 1910 were 275,200 pounds, valued at \$2,618, and, in 1909, 276,765 pounds valued at \$2,488. The total imports of salt in 1910 were valued at \$462,061, and included: 20,174 tons valued at \$97,326, subject to duty; and 108,794 tons valued at \$364,735, duty free. The 1909 imports were valued at \$431,221 and comprised: 112,554 tons of salt subject to duty, valued at \$352,165; and 16,857 tons duty free, valued at \$79,056.

The imports of soda products in 1910 included: soda ash or barilla 35,596,006 pounds, valued at \$306,167; soda bichromate 878,777 pounds, valued at \$32,842; caustic soda in packages of 25 pounds or more 13,848,170 pounds, valued at \$260,938; sal soda 9,715,272 pounds, valued at \$72,845, and sulphate of soda 17,728,543 pounds, valued at \$95,054.

*Talc.*—The production of talc increased from 4,350 tons, valued at \$10,300, in 1909, to 7,112 tons, valued at \$22,308, in 1910.



*Tripolite.*—There was a production of 22 tons, valued at \$134, reported for 1910 and no production in 1909.

## STRUCTURAL MATERIALS AND CLAY PRODUCTS.

*Cement.*—The total sales of cement in 1910 were 4,753,975 barrels, valued at \$6,412,215, as against 4,067,709 barrels, valued at \$5,345,802, sold in 1909, showing an increase of 686,266 barrels. The exports of cement in 1910 were valued at \$12,914, compared with exports valued at \$113,362 in 1909.

The imports of cement in 1910 included: manufactures of cement, valued at \$7,718; hydraulic cement, 365 hundredweight, valued at \$349; and Portland cement, 1,222,586 hundredweight (349,310 barrels) valued at \$468,046. The imports in 1909 were: manufactures of cement, valued at \$6,374; hydraulic cement, 682 hundredweight, valued at \$614; and Portland cement, 497,678 hundredweight (142,194 barrels) valued at \$166,669.

The consumption of Portland cement in Canada in 1910 was approximately 5,103,285 barrels, as compared with 4,209,903 barrels in 1909.

*Clay Products.*—The total value of the production of clay products in Canada in 1910 was \$7,629,956, as compared with a total value of \$6,450,840 in 1909. Brick and tile products alone were valued in 1910 at \$6,377,728, as against \$5,327,815 in 1909. The value of sewerpipe production in 1910 was \$774,110, as compared with \$645,722 in 1909. The only clay products exported in 1910 were: 390,000 building brick, valued at \$2,762, and manufactures of clay valued at \$9,061; against 365,000, valued at \$2,255, in 1909, and manufactures valued at \$979. The total imports of clay products in 1910 were valued at \$4,331,397, and included: brick and tile valued at \$1,755,773; earthenware and chinaware, \$2,283,116, and clays valued at \$292,508. The total imports in 1909 were valued at \$3,247,539, comprising: brick and tile. \$1,249,450; earthenware and china-ware, \$1,781,759, and clays, \$216,330.

*Lime.*—The total production of lime in 1910 was 5,848,146 bushels, valued at \$1,137,079, as compared with 5,592,924 bushels, valued at \$1,132,756, in 1909. The exports of lime in 1910 were valued at \$44,762, as against exports valued at \$48,821 in 1909. The imports of lime in 1910 were 212,502 barrels, valued at \$138,847, and in 1909, 168,357 barrels, valued at \$118,239.

*Sand-Lime Brick.*—The total sales of sand-lime brick in 1910 by 13 firms reporting were 44,593,541, valued at \$371,857, an average value of \$8.34 per thousand. The sales in 1909 by 9 firms reporting were 27,052,864 brick valued at \$201,650, an average of \$7.45 per thousand.

*Slate.*—The production of slate in 1910 was 3,959 squares valued at \$18,492, and 4,000 squares, valued at \$19,000, in 1909.

The imports of slate in 1910 were valued at \$142,285, and included: roofing slate, valued at \$67,063; school writing slate, \$31,397; slate pencils, \$6,948, and manufactures of slate, \$36,877.

The imports in 1909 were valued at \$135,221, comprising: roofing slate, \$71,914; school writing slate, \$34,085; slate pencils, \$6,154, and manufactures of slate, \$23,068.

*Stone.*—The total value of the production of stone of all kinds, in 1910, was \$3,650,019, as compared with a value of \$3,127,135 in 1909. The value of stone exports in 1910 was \$27,471, as against \$59,370 in 1909; and the total value of stone imported in 1910 was \$845,123, as against imports valued at \$683,801 in 1909.

The production in 1910 included: granite valued at \$739,516; limestone, \$2,249,576; marble, \$158,779, and sandstone, \$502,148. In 1909 the production of granite was valued at \$454,824; limestone, \$2,139,691; marble, \$158,441, and sandstone, \$374,179.

Classifying the output according to the purposes for which the stone was used, the production in 1910 comprised: building stone, valued at \$1,504,001; ornamental and monumental stone, \$147,421; paving and curbstone, \$239,668; rubble, \$352,000; crushed stone, \$975,379; and furnace flux, \$431,550; while in 1909 the production included: building stone, valued at \$1,170,550; ornamental and monumental stone, \$306,338; paving and curbstone, \$279,227; rubble, \$303,120; crushed stone, \$664,287, and furnace flux, \$403,613.

#### PRODUCTION BY PROVINCES.

A summary of the mineral production by provinces in 1909 and 1910 is shown in the accompanying tables, in the first of which the total production in the several provinces, and the percentage of each, is given for the past three years. It will be observed that the largest production during each of the last three years has been from the Province of Ontario, British Columbia occupying second place. These two Provinces together contributed about 64 per cent of the total production in 1910. The Province of Alberta now occupies fourth place in mineral production, displacing Quebec, which drops to fifth position.

The last table shows the mineral production by provinces for the years 1899 to 1910 inclusive.



## Mineral Production by Provinces, 1908, 1909, and 1910.

Province.	1908.		1909.		1910.	
	Value of Production.	Per cent of Total.	Value of Production.	Per cent of Total.	Value of Production.	Per cent of Total.
	\$	%	\$	%	\$	%
Nova Scotia.....	14,487,108	16.93	12,504,810	13.62	14,195,730	13.29
New Brunswick.....	579,816	0.68	657,035	0.71	581,942	0.54
Quebec.....	6,372,949	7.45	7,086,265	7.72	8,270,136	7.74
Ontario.....	30,623,812	35.79	37,374,577	40.70	43,538,078	40.76
Manitoba.....	584,374	0.68	1,193,377	1.30	1,500,359	1.40
Saskatchewan.....	413,212	0.48	456,246	0.50	498,122	0.47
Alberta.....	5,122,505	5.99	6,047,447	6.58	8,996,210	8.42
British Columbia.....	23,704,035	27.71	22,479,006	24.48	24,478,572	22.92
North West Territories....	3,669,290	4.29	4,032,678	4.39	4,764,474	4.46
Dominion.....	85,557,101	100.00	91,831,441	100.00	106,823,623	100.00

## Mineral Production of Nova Scotia, 1909 and 1910.

Product.	1909.		1910.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Gold.....	Ozs. 10,193	210,711	7,928	163,891
Iron ore exports.....	Tons 18,134	51,330	18,134	51,330
Pig iron from Canadian ore (b).....	" 10,452	104,520	4,787	57,444
Coal.....	" 5,652,089	11,354,643	6,431,142	12,919,705
Grindstones.....	" 312	3,204	3,586	43,700
Gypsum.....	" 345,682	364,379	400,455	458,638
Barytes.....	" 179	1,120		
Tripolite.....	"		22	134
Clay products.....		188,185		204,782
Stone.....		189,604		227,635
Lime.....	Bus. 57,730	16,729	55,750	13,490
Other products (a).....		71,715		54,981
Total.....		12,504,810		14,195,730

(a) Includes in 1910 antimony, arsenic, and cement; in 1909 antimony, arsenic and cement.

(b) The total production of pig iron in Nova Scotia in 1910 was 350,287 tons valued at \$4,203,444, and in 1909, 345,380 tons valued at \$3,453,800.

## Mineral Production of New Brunswick, 1909 and 1910.

Product.	1909.		1910.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Iron ore exports..... Tons.			5,336	15,075
Coal..... "	49,029	98,496	55,455	110,910
Grindstones..... "	3,963	51,460	387	3,496
Gypsum..... "	98,716	226,975	90,236	213,579
Mineral water.....		14,003		16,000
Petroleum..... Bls.			1,485	1,826
Clay products.....		65,570		56,475
Lime..... Bus.	697,466	154,151	470,050	105,593
Stone.....		42,180		58,988
Other products.....		4,200		
Total.....		657,035		581,492

## Mineral Production of Quebec, 1909 and 1910.

Product.	1909.		1910.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Gold..... Ozs.	193	3,990	124	2,565
Copper..... Lbs.	1,088,212	141,272	877,347	111,757
Pig iron from Canadian ore (b)..... Tons.	3,960	104,289	2,474	65,156
Silver..... Ozs.	13,233	6,815	7,593	4,061
Asbestos and asbestic..... Tons.	87,300	2,301,773	102,215	2,573,603
Chromite..... "	2,470	26,608	299	3,734
Feldspar..... "	97	1,712	90	1,800
Magnesite..... "	330	2,503	323	2,160
Mica..... "		93,290		87,295
Ochres..... "	3,940	28,096	4,813	33,185
Mineral water.....		68,565		68,194
Peat.....			70	280
Phosphate..... Tons.	525	4,804	1,456	12,386
Pyrites.....	35,300	130,009	24,242	102,162
Quartz..... "			805	1,006
Graphite..... "	134	10,178	155	16,000
Cement..... Bls.	1,011,194	1,314,550	1,563,714	1,954,646
Clay products.....		1,153,830		1,442,842
Lime..... Bus.	1,281,827	315,632	1,227,555	299,126
Slate..... Squares.	4,000	19,000	3,959	18,492
Stone.....		1,359,349		1,469,686
Total.....		7,086,265		8,270,136

(b) The total production of pig iron in Quebec in 1910 was 3,237 tons valued at \$85,255; in 1909, 4,770 tons valued at \$125,623.

There was also in this Province an important production of aluminium from imported ores.

## Mineral Production of Ontario, 1909 and 1910.

Product.		1909.		1910.	
		Quantity.	Value.	Quantity.	Value.
			\$		\$
Copper.....	Lbs.	15,746,699	2,044,237	19,259,016	2,453,213
Gold.....	Ozs.	1,569	32,425	3,089	63,849
Pig iron from Canadian ore (b).....	Tons.	135,032	2,013,406	97,645	1,528,249
Iron ore, exports.....	"	21,956	61,954	90,979	257,781
Nickel.....	Lbs.	26,282,991	9,461,877	37,271,033	11,181,310
Cobalt.....	"		94,609		51,986
Silver.....	Ozs.	24,822,099	12,784,126	30,366,366	16,241,755
Zinc ore.....	Tons.	895	8,950	576	5,760
Actinolite.....	"			30	330
Arsenic, white and arsenical ore.....	"		64,100		75,328
Corundum.....	"	1,491	162,492	1,870	198,680
Feldspar.....	"	12,686	38,664	15,719	45,867
Fluorspar.....	"			2	15
Graphite.....	"	730	37,624	1,237	58,087
Gypsum.....	"	11,731	48,278	15,055	67,229
Mica.....	"		54,484		103,090
Mineral water.....	"		92,610		111,369
Natural gas.....	"		1,145,307		1,271,303
Peat.....	Tons.	60	240	771	2,324
Petroleum.....	Bls.	420,755	559,604	314,410	386,724
Phosphate.....	Tons.	473	3,254	22	192
Pyrites.....	"	29,344	92,812	29,628	84,902
Quartz.....	"	56,924	71,285	87,400	90,945
Salt.....	"	84,037	415,219	84,092	409,624
Talc.....	"	4,350	10,300	7,112	22,308
Cement.....	Bls.	2,462,027	3,084,218	2,504,650	3,150,479
Clay products.....	"		3,425,841		3,667,810
Lime.....	Bus.	2,619,553	434,147	2,988,020	476,137
Stone.....	"		748,639		898,788
Other products (a).....	"		383,875		632,644
Total.....			37,374,577		43,538,078

(a) Includes in 1909 and 1910, sand-lime brick; sand and gravel (exports). (b) The total production of pig iron in Ontario in 1910 was 447,273 tons valued at \$6,956,923; in 1909, 407,012 tons valued at \$6,002,441.

## Mineral Production in Manitoba, 1909 and 1910.

Product.		1909.		1910.	
		Quantity.	Value.	Quantity.	Value.
			\$		\$
Gypsum.....	Tons.	17,000	170,000	19,500	195,000
Clay products.....	"		559,008		781,605
Lime.....	Bus.	423,954	69,670	606,679	100,808
Cement.....	Bls.	8,600	8,600	18,561	21,995
Sand-lime brick.....	No.	6,400,000	54,200	7,817,785	69,279
Other products (e).....	"		331,899		331,672
Total.....			1,193,377		1,500,359

(e) Includes building stone, etc.

## Mineral Production in Saskatchewan, 1909 and 1910.

Product.	1909.		1910.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Coal..... Tons.	192,125	296,339	181,156	293,923
Brick..... No.	14,416,770	144,316	14,733,340	160,850
Other products (a).....		15,591		43,349
Total.....		456,246		498,122

(a) Includes in 1909, sand-lime brick, fireclay, etc.; in 1910, sand-lime brick.

## Mineral Production in Alberta, 1909 and 1910.

Product.	1909.		1910.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Gold..... Ozs.	25	525	89	1,850
Coal..... Tons.	1,994,741	4,838,109	2,894,469	7,065,736
Natural gas.....		61,722		75,168
Cement..... Bls.			323,009	774,473
Clay products.....		442,486		753,232
Other products (a).....		704,605		325,751
Total.....		6,047,447		8,996,210

(a) Includes in 1909, cement, lime, stone, etc.; in 1910, lime, sand-lime brick, and stone.

## Mineral Production in British Columbia, 1909 and 1910.

Product.	1909.		1910.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Copper (b)..... Lbs.	35,658,952	4,629,245	35,270,006	4,492,693
Gold..... Ozs.	250,320	5,174,579	261,386	5,403,318
Lead..... Lbs.	45,857,424	1,692,139	32,987,508	1,216,249
Silver..... Ozs.	2,649,141	1,364,387	2,407,887	1,287,883
Zinc ore.....	17,476	233,749	4,487	114,243
Coal..... Tons.	2,606,127	8,144,147	3,330,745	10,408,580
Mineral water.....				4,000
Clay products.....		470,402		562,360
Lime..... Bus.	231,269	75,076	196,878	72,657
Stone.....		365,081		422,392
Other products.....		(d) 330,201	(c)	494,197
Total.....		22,479,006		24,478,572

(b) Smelter recoveries of copper. (c) Includes cement, sand-lime brick, etc. (d) Includes cement, sand-lime brick, and small value in refined antimony.

## Mineral Production in Yukon, 1909 and 1910.

Product.	1909.		1910.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Copper..... Lbs.			286,000	36,431
Gold..... Ozs.	191,565	3,960,000	221,091	4,570,362
Silver..... "	45,000	23,176	87,418	46,756
Coal..... Tons.	7,364	49,502	16,185	110,925
Total.....		4,032,678		4,764,474



# Mineral Production by Provinces, 1899-1910.

Calendar Year.	Nova Scotia	New Brunswick.	Quebec.	Ontario.	Manitoba.	Alberta.	Saskatchewan.	Yukon.	British Columbia.	Total.
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
1899.....	6,817,274	420,227	2,585,635	9,819,557		17,108,707			12,482,605	49,234,005
1900.....	9,298,479	439,060	3,292,383	11,258,099		23,432,330			16,680,526	64,420,877
1901.....	7,770,159	467,985	3,759,984	13,970,010		19,297,940			20,531,833	65,797,911
1902.....	10,686,549	607,129	3,743,636	14,619,091		16,127,400			17,448,031	63,231,836
1903.....	11,431,914	580,495	3,585,938	14,160,033		14,082,986			17,899,147	61,740,513
1904.....	11,212,746	559,913	3,688,482	12,582,843		12,713,613			19,325,174	60,082,771
1905.....	11,507,047	559,035	4,405,975	18,833,292		11,387,642			22,386,008	69,078,999
1906.....	12,894,303	646,328	5,242,058	25,111,682		10,092,726			25,239,600	79,286,697
1907.....	14,532,040	664,647	6,205,553	30,381,638	898,775	4,657,524	533,251	3,335,898	25,656,056	86,805,202
1908.....	14,487,108	579,816	6,372,949	30,623,812	584,374	5,122,505	413,212	3,669,290	23,704,035	85,557,101
1909.....	12,504,810	657,065	7,086,265	37,374,577	1,193,377	6,047,447	456,246	4,032,678	22,479,006	91,831,441
1910.....	14,195,730	581,942	8,270,136	43,538,078	1,500,359	8,996,210	498,122	4,764,474	24,478,572	106,823,623

## MINE PRODUCTION.

The statistics of metalliferous production published in the tables preceding show in most cases the quantities of metals recovered or probably recoverable.

A general consideration of actual mine operations from the viewpoint of the actual tonnage of ore mined, the quantities concentrated, and the tonnage shipped to smelters is also of much interest.

This Department has been endeavouring to obtain from every metalliferous mine operator in Canada an annual return with respect to:—

- (1) The number of men employed and wages paid.
- (2) The total tonnage of ores mined, the tonnage concentrated, and the quantities of concentrates produced.
- (3) The tonnage of ores or concentrates shipped and the net value thereof.
- (4) The quantities of metals as determined by settlement assays contained in the ores shipped, and the quantities of metals for which payment was made by the purchasing smelter or recovered by the operators' smelter.

While it has not been possible to obtain returns from every mine operator, the missing returns usually represent comparatively small productions and sufficient information is available to give a fairly close estimate of results.

The metalliferous ores mined in Canada fall naturally into a number of more or less broad groups, of which iron ores constitute a distinct class.

Milling gold ores, including certain dry ores shipped to smelters, may be considered as a second group.

The silver and silver-cobalt-nickel ores of Ontario fall naturally into a separate class, as do also the nickel-copper ores of the same Province. The silver-lead, and zinc ores chiefly of British Columbia may also be considered as a separate group.

A broad class of ores, mined in British Columbia chiefly, may be grouped under a general class known as gold-copper-silver ores. There is also a small production of copper pyrites ores and straight copper ores that may for convenience be grouped as copper ores. No record is available as to the amount of gravel handled in connexion with placer gold production.

Returns covering the year 1910, show that shipments were made from approximately 191 metalliferous mines, employing an average of over 8,800 men, to whom about \$7,359,000 was paid in wages. The amount of ore mined exceeded 3,595,000 tons, and ores and concentrates shipped exceeded 2,978,000 tons, having a net value reported as about \$29,050,000.

## Metalliferous Mine Production, 1910.

	No. of Mines	Men Employed		Wages paid.	Ores mined.	Ores and concentrates shipped.	Net value of shipments.
		Under- ground.	Surface.				
				\$			\$
Iron ores.....	8	971	.....	443,998	335,768	259,418	574,362
Milling gold ores: concentrates ship- ped.....	47	969	.....	725,989	138,021	8,997	793,080
Silver-cobalt-nickel.	38	1,623	1,322	2,642,133	274,780	35,627	15,344,470
Nickel-copper ores..	7	660	286	719,237	652,392	652,392	2,609,568
Copper ores.....	3	118	97	105,366	54,220	36,714	172,162
Silver,lead, and zinc ores.....	48	592	282	850,416	180,070	53,355 5,063	1,668,415
Gold - copper - silver ores.....	19	1,432	487	1,872,242	1,958,591	1,924,405	7,888,306
Shipping mines not reporting:							
Silver-lead.....	12	.....	.....	.....	1,994	1,994	
Copper-gold.....	9	.....	.....	.....			
	191	8,839		7,359,381	3,595,836	2,977,965	29,050,363

In the mining of non-metallic products, excluding petroleum and the structural materials and clay products, there were employed about 36,210 men earning in wages over \$22,698,000. The total tonnage of products mined was 16,148,993, and the tonnage shipped 13,800,989, having a net value of \$37,757,158.

The production of cement, clay products, stone, lime, etc., employed 17,259 men earning \$7,547,000 in wages, and the products shipped had a net value of \$19,627,592.

For the whole mining industry of Canada in 1910, excluding placer gold and petroleum, there were employed over 62,000 men earning over \$37,600,000 in wages.

## SMELTER PRODUCTION.

Statistics of the production of copper and lead smelters, showing the tonnage of ore treated, the matte, blister, base bullion, or refined metal produced, etc., were collected for the first time by this Branch in 1908 and were published in the report for that year. Similar returns have also been received covering the years 1909 and 1910, through the courtesy of the following operating companies:—

The Mond Nickel Company,	Victoria Mines, Ont.
The Canadian Copper Company,	Copper Cliff, Ont.
The Coniagas Reduction Company,	Thorold, Ont.
The Deloro Mining and Reduction Company,	Deloro, Ont.

The Consolidated Mining and Smelting Company  
of Canada,

Trail, B.C.

<sup>1</sup> The Northport Smelting and Refining Company, Northport, Wash., U.S.A.

The Granby Consolidated Mining, Smelting and  
Power Company,

Grand Forks, B.C.

The British Columbia Copper Company,  
Limited,

Greenwood, B.C.

The Tyee Copper Company, Limited,

Ladysmith, B.C.

The Canadian Antimony Company,

St. George, N.B.

The aggregate quantity of ore and concentrates treated in these works during 1910 was 2,683,714 tons, as compared with 2,376,148 tons in 1909, and 2,218,395 tons in 1908.

The ores may be conveniently classified as shown in the following table:--

	1908.	1909.	1910.
	Tons.	Tons.	Tons.
Nickel-copper ores.....	360,180	462,336	628,947
Silver-cobalt-nickel-arsenic ores.....	7,182	8,384	9,466
Lead and other ores treated in lead furnaces.....	53,545	54,539	57,549
Copper-gold-silver ores.....	1,797,488	1,850,889	1,987,752
Total.....	2,218,395	2,376,148	2,683,714

The products obtained in Canada from the treatment of these ores include: refined lead produced at Trail, B.C., and fine gold, fine silver, copper sulphate, and antimony produced from the residues of the lead refinery; silver bullion, white arsenic, nickel oxide and cobalt oxide produced in Ontario, from the Cobalt District ores; refined antimony, produced in New Brunswick. In addition to these refined products, blister copper, copper matte, nickel-copper matte, and speiss resulting from the treatment of the Cobalt ores, are produced and exported for refining outside of Canada.

The aggregate results of smelting and refining operations may be summarized as shown in the next table. Unfortunately the figures cannot be taken to represent the total production from smelting ores mined in Canada, since considerable quantities of copper and silver ores are still shipped to other smelters outside of Canada for smelting.

It should also be explained that the figures include the results of the treatment of a small quantity of imported ores.

<sup>1</sup>The Northport smelter when in operation treated Canadian ore, almost exclusively, and for statistical purposes has been considered as if located in Canada.

## Smelter and Refinery Production in Canada, 1908, 1909, and 1910.

	1908.		1909.		1910.	
	Refined products	Metals contained in matte, blister, base bullion, and speiss.	Refined products	Metals contained in matte, blister, base bullion, and speiss.	Refined products	Metals contained in matte, blister, and base bullion.
Antimony.....Lbs.			61,207			
Gold.....Ozs.	15,436	203,300	18,241	200,129	13,298	197,181
Silver.....“	11,168,689	3,271,899	14,242,545	4,845,920	16,373,799	2,136,414
Lead.....Lbs.	36,549,274	1,116,792	41,883,614	3,973,810	32,987,508	
Copper.....“		51,965,289		53,328,583		56,149,299
Copper sulphate “	203,379		51,405		163,228	
Nickel.....“		19,506,251		27,041,957		37,587,676
Cobalt.....“		692,170		1,321,083		
White arsenic. “	1,431,052		2,258,087		3,003,467	
Arsenic.....“		436,787		1,074,516		

Smelter products shipped outside of Canada for refining were: blister copper, carrying gold and silver values, 13,918 tons in 1910, as compared with 14,239 tons in 1909, and 15,418 tons in 1908; copper matte carrying gold and silver values, 11,519 tons in 1910, as against 11,597 tons in 1909, and 7,649 tons in 1908; Bessemer nickel-copper matte carrying small gold and silver values as well as metals of the platinum group, 35,033 tons in 1910, as compared with 25,845 tons in 1909, and 21,210 tons in 1908; lead bullion carrying gold and silver values, none in 1910, 2,010 tons in 1909; speiss resulting from the treatment of the Cobalt District ores carrying silver, cobalt, nickel, and arsenic values is also to some extent exported for refining though much of this material is returned to the furnaces.

*Nickel-Copper Ores.*—The smelters of the Canadian Copper Company at Copper Cliff and the Mond Nickel Company at Victoria Mines treat the nickel-copper ores of the district. These ores consist of pyrrhotite and chalcopyrite, the nickel being chiefly contained in the mineral pentlandite disseminated through the ore. The greater part of the ore is roasted in open heaps. In 1908,<sup>1</sup> the total quantity of ore mined was 409,551 tons, while the quantity smelted was 360,180 tons. The quantity of Bessemer matte shipped was 21,210 tons, containing 7,503 tons of copper and 9,572 tons of nickel. In 1909 the quantity of ore mined was 451,892 tons, while the quantity smelted was 462,336 tons. The quantity of Bessemer matte produced was 25,845 tons, containing 7,873 tons copper and 13,141 tons of nickel.

In 1910 the total quantity of ore mined was 652,392 tons, while the quantity smelted was 628,947 tons. The quantity of Bessemer matte produced was 35,033 tons, containing 9,630 tons of copper and 18,636 tons of nickel.

Statistics of the smelter production from these ores are available since the commencement of the industry and are shown in the following table:—

<sup>1</sup>See also the statistics given in the chapter on nickel.



## Smelter Production of the Nickel-Copper Ores of the Sudbury District.

Calendar Year.	Ore Mined.	Ore Smelted.	Matte Shipped.	Value Matte.	Nickel content of Matte.	Copper content of Matte.
	Tons.	Tons.	Tons.	\$	Tons.	Tons.
1886.....	3,307	30,000	3,274	766,422	900	1,500
1887.....	567					
1888.....	44,990					
1889.....	83,300	72,558	10,336	890,834	2,018	2,064
1890.....	74,381	57,022	9,425	416,594	1,207	1,102
1891.....	103,223	96,038	11,681	766,422	1,991	1,821
1892.....	74,135	68,618	10,188	890,834	2,454	2,604
1893.....	94,966	71,027	10,759	416,594	1,944	2,288
1894.....	93,154	96,370	13,968		1,699	1,584
1895.....	123,820	121,924			1,999	2,750
1896.....	159,957	172,761		702,341	2,759	4,187
1897.....	196,420		23,336	1,076,306	2,872	2,834
1898.....	315,692	255,958		1,661,839	3,540	3,364
1899.....	269,538	211,847	25,311	1,327,448	4,594	4,318
1900.....	136,033	207,030	13,832	2,686,469	5,347	3,553
1901.....	203,388	118,470	10,154	2,193,198	6,253	3,576
1902.....	277,766	251,421	17,405	4,019,814	5,274	2,455
1903.....	343,814	340,059	20,310	4,628,011	9,438	4,386
1904.....	351,916	359,076	22,025	3,289,382	10,745	5,264
1905.....	409,551	360,180	21,210	2,930,989	10,595	6,996
1906.....	451,892	462,336	25,845	3,913,012	9,572	7,503
1907.....	652,392	628,947	35,033	5,380,064	13,141	7,873
1908.....					18,636	9,630

*Silver-Cobalt-Nickel-Arsenic Ores.*—The rich silver ores of the Cobalt district, the first shipments of which were made in 1904, are still to a large extent shipped out of Canada, even for first treatment.

Three Canadian smelters are treating these ores, and silver bullion, white arsenic, and nickel and cobalt oxides are being recovered.

The Canadian Copper Company established works for the treatment of these ores at Copper Cliff in 1906 at which silver bullion and white arsenic are recovered. The Coniagas Reduction Company built a plant at Thorold, Ont., in 1908, for the treatment of the ores of the Coniagas mine and also custom ore, and the Deloro Mining and Reduction Company established works at Deloro, Ont., for the treatment of cobalt silver ores. At both of these latter plants, nickel and cobalt oxides are recovered in addition to silver bullion and white arsenic.

The treatment of these ores in Ontario in 1908, 1909, and 1910 gives the following results:—

		1908.	1909.	1910.
Ore treated.....	Tons	7,182	8,384	9,466
Products recovered:*				
Silver produced†.....	Ozs.	9,212,650	12,239,542	14,574,839
White arsenic.....	Lbs.	1,431,052	2,258,087	3,003,467
Speiss or residues.....	Tons	1,326	2,660	3,074
Metallic contents of speiss:—				
Silver.....	Ozs.	2,612,344	4,103,251	.....
Nickel.....	Lbs.	363,140	758,966	.....
Cobalt.....	"	692,170	1,321,083	.....
Arsenic.....	"	436,787	1,074,516	.....

\* Nickel oxide and cobalt oxide were also produced in small quantities.

† Fine ounces contained in silver bullion, fineness ranging from 850 to 998.

*Lead Ores.*—There was but one lead smelting plant in operation in Canada in 1910, viz., that at Trail, B.C., operated by the Consolidated Mining and Smelting Company of Canada, Limited. This smelter is supplemented by a lead refinery employing the Betts Electrolytic Process and having a capacity of 100 tons per day. The main ore supply comes from the St. Eugene mine, owned by the same Company, though practically all the lead ore produced in the Slocan district is smelted as customs ore. Supplementing the lead ores is a small tonnage of gold and silver ores, with some gold concentrates from stamp mills.

In the refinery, the bullion from the smelter is cast into anodes and re-deposited electrolytically upon cathode starting sheets of refined lead. The refined lead is cast into pigs of 100 pounds and 180 pounds weight, the latter being a special form for the Chinese trade.

The slimes from the tank room carry gold, silver, antimony, arsenic, and copper. The first two are recovered as fine metals, and the copper as copper sulphate.

Antimony is recovered, though not regularly, and bearing metal is manufactured.

The annual production of refined lead, fine gold and silver, and of copper sulphate has been as follows:—

Calendar Year.	Refined Lead.	Fine Gold.	Fine Silver.	Copper Sulphate.
	Lbs.	Ozs.	Lbs.	Lbs.
1904.....	7,519,440	4,336	551,450	56,000
1905.....	15,804,509	8,602	1,088,328	77,175
1906.....	20,471,314	9,993	1,263,809	143,135
1907.....	26,607,461	10,395	1,631,422	97,751
1908.....	36,549,274	15,346	1,956,039	203,379
1909.....	41,883,614	18,241	2,003,003	51,405
1910.....	32,987,508	13,298	1,798,960	163,228

*Gold-Silver-Copper Ores of British Columbia.*—There are six copper smelters in British Columbia, in addition to the smelter at Northport, Wash., U.S.A., treating these complex ores.

The ores of the Rossland camp, of which gold is the chief constituent value, are smelted in the Trail copper furnace of the Consolidated Mining and Smelting Company, and at the Northport smelter. The low grade copper ores of the Boundary district are smelted locally at Grand Forks, Greenwood, and Boundary Falls, some also going to Trail.

On the coast the ores of this class are smelted at Ladysmith and Crofton, but a considerable tonnage is also shipped to United States smelters for treatment, while the local smelters are receiving some foreign ores. The Crofton smelter, which has not been in operation during the past three years, is owned by the Britannia Copper Syndicate, Limited. The Boundary Falls smelter was out of commission throughout 1909 and 1910.

The aggregate production of these smelters in 1908, 1909, and 1910, including the foreign ores treated, was as follows:—

	1908.	1909.	1910.
Ore smelted..... Tons	1,797,488	1,850,889	1,987,752
Smelter products—			
Matte..... “	7,649	11,597	11,519
Blister..... “	15,418	14,239	13,918
Metallic content of matte and blister—			
Gold..... Ozs.	202,959	198,898	197,181
Silver..... “	631,484	612,164	636,140
Copper..... Lbs.	36,960,118	37,581,884	36,890,283

*Trail Smelter.*—Statistics of the production of the Trail smelter, including both the copper and lead smelters, have been published in the annual reports of the Company, the figures since 1906 having been as follows:—

#### Production of Trail Smelter.

Year Ending June 30.	Ore Smelted.	METALS CONTAINED IN MATTE AND BULLION PRODUCED.			
		Gold.	Silver.	Lead.	Copper.
	Tons.	Ozs.	Ozs.	Lbs.	Lbs.
1906 (6 mos. only).....	157,640	64,590	1,074,255	15,133,683	2,399,161
1907.....	222,573	69,168	1,100,271	20,383,083	3,443,310
1908.....	305,956	121,380	2,224,888	32,157,139	4,004,468
1909.....	347,417	114,920	2,443,475	43,675,077	4,637,631
1910.....	487,125	137,614	2,162,406	42,368,816	5,974,959
1911.....	388,785	119,067	1,458,758	24,026,015	4,421,988
Production from 1894 to June, 1911	2,847,469	1,017,123	18,458,631	224,898,570	47,875,802

*Granby Smelter.*—The smelting plants of the Boundary district are of particular interest on account of the low grade ore treated. These ores vary from 1 to 3 per cent in copper and from \$1 to \$3 in gold and silver, and over 1,000,000 tons are now annually smelted. There are three smelters in the district, the largest being that at Grand Forks, operated by the Granby Consolidated Mining, Smelting, and Power Company. The first furnace, of 300 tons capacity, was completed in 1890, and since that date the capacity of the plant has from time to time been increased, until at present there are eight furnaces with a capacity of about 4,500 tons per day. The converter plant, which was first installed in 1902, has now a capacity of 40,000,000 pounds per year.

The quantities of ores smelted and the total production of metals, shown in the next table, are as published in the Annual Report of the Company for the year ending June 30, 1910.

**Ore Smelted and Metals Recovered at Granby Smelter.**

Year ending June 30.	ALL MATERIAL SMELTED.				METALS PRODUCED.		
	Granby ore.	Foreign.		Total.	Gold.	Silver.	Copper.
		Ore.	Matte.				
Tons.	Tons.	Tons.	Tons.	Ozs.	Ozs.	Lbs.	
1901.....	169,087	7,832	.....	176,919	8,871	34,990	5,435,955
1902.....	293,645	4,454	3,001	301,100	30,786	274,511	10,836,851
1903.....	289,583	7,691	6,223	303,497	35,121	277,574	12,551,758
1904.....	516,059	36,182	4,290	556,531	54,493	275,935	16,020,986
1905.....	550,738	39,382	.....	590,120	42,980	215,449	14,224,692
1906.....	796,188	36,158	.....	832,346	50,020	316,947	19,939,004
1907.....	649,022	16,893	.....	665,915	32,738	201,337	16,410,576
1908.....	858,432	24,179	.....	882,611	40,068	300,204	21,092,288
1909.....	964,789	19,944	.....	984,733	45,760	335,520	21,901,528
1910.....	1,175,548	21,829	.....	1,197,377	48,752	356,746	22,754,899
1911.....	959,563	24,783	.....	984,346	41,707	343,178	17,858,860
Total.....	7,222,654	239,327	13,514	7,475,495	431,296	2,932,391	179,027,397

*Greenwood Smelter.*—At this plant, owned by the British Columbia Copper Company, there are three large furnaces having a total daily capacity of from 2,400 to 2,500 tons per day.

In the Annual Report of the Company for the year ending November 30, 1910, the General Manager, Mr. J. E. McAllister, refers to the smelting operations as follows:—



### " The Reduction Works.

"In order to provide for the production of the Wellington Camp and Lone Star mines, as well as for ores purchased from the New Dominion Copper Company, it was decided in April to increase the capacity of the works. This was accomplished by lengthening two of the three blast furnaces each by 50 per cent, thereby acquiring an increased blast furnace capacity of one-third. Two electric locomotives were added to the equipment, one for the charging and the other for the slag railway, the converting department was enlarged by the extension of the building and the crane runway, as well as the addition of two more converter shells, and the capacity of the sampling mill was increased to 125 tons per hour. The total expenditure for enlarging the capacity of the works by one-third amounted to 5.3 per cent of the previous book value of the plant, and during the progress of construction, the works were constantly in operation. Material handled in operations, exclusive of coke, amounted to:—

British Columbia Copper Co.'s ore.. . . .	399,353 tons.
Custom ores.. . . .	36,575 "
Converter slag.. . . .	5,744 "
	<hr/>
	441,672 "

Included in the item of converter slag is 2,385 tons of custom ore and clay.

"7,199,034 pounds of blister copper was produced from the above material handled, containing:—

Fine copper.. . . .	7,143,456 lbs.
Gold.. . . .	24,962 ozs.
Silver.. . . .	84,180 ozs.

### " Operating Costs.

"These have been adversely affected by the extensive construction in progress at different points and particularly at the reduction works, where the inconvenience of making changes while at the same time conducting a continuous process was most felt, and in addition the effect of the more expensive mining and freight of Wellington Camp ore is apparent.

"The yield in all three metals is higher than for the previous two years and the percentage of extraction has been greater, which has permitted of a material reduction in the cost per pound of copper produced, but the average price realized for copper shows a steady decline for the three years. As in the past, the operating costs bear all charges for development and renewals and the maintenance of the various plants in a high state of efficiency.



“The following tabulation gives a comparison of the principal items during the past three years:—

	1908.	1909.	1910.
Yield of copper per ton of B. C. C. Co.'s copper bearing ore.....	17·8 lbs.	17·7 lbs.	18·0 lbs.
Yield of gold and silver per ton of B. C. Copper Company ores.....	\$ 0·985	\$ 1·03	\$ 1·23
Average price realized for copper.....	13·504 cts.	13·08 cts.	12·778 cts.
Cost of producing, refining, and marketing per pound of fine copper, after crediting expenditure with gold and silver values.....	9·996 cts.	9·829 cts.	9·048 cts.
Cost per ton of ore handled including all charges from ore in place to sale of the contained metals.	\$ 2·632	\$ 2·683	\$ 2·730

*The Ladysmith Smelter.*—This smelter is owned and operated by the Tyee Copper Company, and was the only Canadian smelter in operation on the coast during 1908, 1909, and 1910. Both domestic and imported ores are treated, but the Company has not published details of its smelter operations during the past year.

## METALLIC PRODUCTS.

### COPPER.

The total production of copper in Canada in 1910, estimated on the basis of smelter recovery from ores treated, was 55,692,369 pounds, which at the average price of copper for the year in New York, 12.738 cents per pound, would be worth \$7,094,094.

The copper production in 1909, compiled on a similar basis, was estimated at 52,493,863 pounds, showing a slight increase in production in 1910. The average New York price for copper in 1909 was 12.982 cents, the decrease in price being 0.242 cents or 1.9 per cent.

In the Province of British Columbia the copper production is mainly derived from ores carrying a very low content of copper metal. In the smelting of these ores the copper losses in slag are quite considerable, reaching as high, in some cases, as 25 per cent or more, of the copper or content of the ore. With ores of this character there is, therefore, a wide difference between the copper content of ore shipped from the mine and the copper metal recovered by the smelters.

The statistics of copper production for the years previous to 1909 as given in Tables 1 and 2 include for British Columbia a record of the copper production in that Province as collected by the Provincial Bureau of Mines. These are compiled on the basis of the total metal content of the ores sent to smelters for which smelter returns were received during the year, and these show a relatively higher copper production than the figures published by the Province of Ontario, which are based on copper content of matte produced.

The independent collection of statistics on smelter production by this branch—through the courtesy of the smelter operators—has made possible the compilation and publication of statistics of production based on smelter recoveries as given above; thus providing for a more equitable comparison of the production of the several provinces, and of the production of Canada generally, with other countries.

## COPPER.—TABLE 1.

## Production by Provinces 1908, 1909, and 1910.

Provinces.	1908.		1909†		1910.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
		\$		\$		\$
Quebec.....	1,282,024	169,336	1,088,212	141,272	877,347	111,757
Ontario.....	15,005 171	1,981,883	15,746,699	2,044,237	19,259,016	2,453,213
British Columbia..	47,274,614	6,244,031	35,658,952	4,629,245	35,270,006	4,492,693
Other Districts *..	141,064	18,632	.....	.....	286,000	36,431
Total.....	63,702,873	8,413,876	52,493,862	6,814,754	55,692,369	7,094,094

\*Includes Nova Scotia and Yukon.

† The apparently large decrease in British Columbia copper production in 1909 as compared with 1908 is mainly due to the different basis of compilation adopted in 1909 for explanation of which see the text. The British Columbia copper production in 1909 based on copper content of ores sent to smelters was 45,597,245 pounds— (See Tables 8 and 9).

With the exception of a small output of copper sulphate at Trail, B.C., the copper production of Canada is practically all exported. The exports of copper in ore, matte, regulus, etc., from Canada during the calendar year, 1910, are reported by the Customs Department as 56,964,127 pounds, of which 51,941,379 pounds were exported to the United States, and 5,022,298 pounds to Great Britain.

The exports in 1909 were recorded at 54,447,750 pounds. These figures agree fairly closely with the statistics of smelter recovery.

*Prices.*—The average monthly prices in cents per pound of electrolytic copper in New York are shown for a period of five years in the accompanying table.

## Monthly Average Prices of Electrolytic Copper in New York.

Months.	1906.	1907.	1908.	1909.	1910.
	Cts.	Cts.	Cts.	Cts.	Cts.
January.....	18·310	24·404	13·726	13·893	13·620
February.....	17·869	24·869	12·905	12·949	13·332
March.....	18·361	25·065	12·704	12·387	13·255
April.....	18·375	24·224	12·743	12·563	12·733
May.....	18·475	24·048	12·598	12·893	12·550
June.....	18·442	22·665	12·675	13·214	12·404
July.....	18·190	21·130	12·702	12·880	12·215
August.....	18·380	18·356	13·462	13·007	12·490
September.....	19·023	15·565	13·388	12·870	12·379
October.....	21·203	13·169	13·354	12·700	12·553
November.....	21·833	13·391	14·130	13·125	12·742
December.....	22·885	13·163	14·111	13·298	12·581
Yearly Average....	19·278	20·004	13·208	12·982	12·738

In London, the monthly average prices of standard copper were as shown hereunder in £ per ton of 2,240 pounds.

### Monthly Average Prices of Standard Copper in London.

Months.	1906.	1907.	1908.	1909.	1910.
	£	£	£	£	£
January.....	78·869	106·739	62·386	57·688	60·923
February.....	78·147	107·356	58·786	61·197	59·388
March.....	81·111	106·594	58·761	56·231	59·214
April.....	84·793	98·625	58·331	57·363	57·238
May.....	84·867	102·375	57·387	59·338	56·313
June.....	83·994	97·272	57·842	59·627	55·310
July.....	81·167	95·010	57·989	58·556	54·194
August.....	88·864	79·679	60·500	59·393	55·733
September.....	87·831	68·375	60·338	59·021	55·207
October.....	97·269	60·717	60·139	57·551	56·722
November.....	100·270	61·226	63·417	58·917	57·634
December.....	105·226	60·113	62·943	59·906	56·069
Yearly average....	87·282	87·007	59·902	58·732	57·054

The price of copper in New York varied from 13 $\frac{3}{4}$  cents per pound in January to a minimum of 12 $\frac{1}{8}$  cents in July.

Statistics showing the annual copper production in Canada since 1886 are given in Table 2, which shows the yearly increase or decrease, as the case may be, and also the yearly price per pound in New York.

## COPPER—TABLE 2.

## Annual Production.

Calendar year.	Lbs.	Increase or Decrease.		Value.	Increase or Decrease.		Average Price per Pound.
		Lbs.	%		\$	%	
				\$			Cts.
1886.....	3,505,000			385,550			11·00
1887.....	3,260,424	(d) 244,576	6·99	366,798	(d) 18,752	4·86	11·25
1888.....	5,562,864	2,302,440	70·60	927,107	560,309	152·70	16·66
1889.....	6,809,752	1,246,888	22·40	936,341	9,234	0·99	13·75
1890.....	6,013,671	(d) 796,081	11·69	947,153	10,812	1·15	15·75
1891.....	9,529,401	3,515,730	58·46	1,226,703	279,550	29·51	12·87
1892.....	7,087,275	2,442,126	25·63	818,580	(d) 408,123	33·27	11·55
1893.....	8,109,856	1,022,381	14·40	871,809	53,229	6·50	10·75
1894.....	7,708,789	(d) 401,067	4·94	736,960	(d) 134,849	15·46	9·56
1895.....	7,771,639	62,850	0·81	836,228	99,268	13·47	10·76
1896.....	9,393,012	1,621,373	20·86	1,021,960	185,732	22·21	10·88
1897.....	13,300,802	3,907,790	41·60	1,501,660	479,700	46·94	11·29
1898.....	17,747,136	4,446,334	33·43	2,134,980	633,320	42·17	12·03
1899.....	15,078,475	(d) 2,668,661	15·04	2,655,319	520,339	24·37	17·61
1900.....	18,937,138	3,858,663	25·59	3,065,922	410,603	15·46	16·19
1901.....	37,827,019	18,889,881	99·75	6,096,581	3,030,659	98·84	16·117
1902.....	38,804,259	977,240	2·58	4,511,383	(d) 1,585,198	26·00	11·626
1903.....	42,684,454	3,880,195	10·00	5,649,487	1,138,104	25·23	13·235
1904.....	41,383,722	(d) 1,300,732	3·05	5,306,635	(d) 342,852	6·07	12·823
1905.....	48,092,753	6,709,031	16·21	7,497,660	2,191,025	41·29	15·590
1906.....	55,609,888	7,517,135	15·63	10,720,474	3,222,814	42·98	19·278
1907.....	56,979,205	1,369,317	2·46	11,398,120	677,654	6·32	20·004
1908.....	63,702,873	6,723,668	11·80	8,413,876	2,984,244	26·18	13·208
1909*	52,493,863			6,814,754			12·982
1910.....	55,692,369	3,198,506	6·09	7,094,094	279,340	4·10	12·738

\*The decrease is not as large as the figures would indicate because of the calculation of part of the 1909 production on a different basis from previous years. (See explanation in text).

Statistics of the exports of copper as collected by the Customs Department are shown in Table 3, and statistics of imports in Tables 4 and 5. The total imports of copper in so far as weights are given, amounted during the fiscal year ending March, 1910, to 23,774,070 pounds. During the calendar year, 1910, the total imports were valued at \$4,369,773, and included crude and manufactured copper to the extent of 30,237,106 pounds, valued at \$4,219,451, together with other copper manufactures valued at \$150,322, of which the quantity is not stated. In detail these imports comprise crude copper (pigs, ingots, scrap, blocks, etc.), 4,914,200 pounds, valued at \$640,181; copper in bars, rods, coils, etc., 20,895,600 pounds, valued at \$2,831,756; copper in strips, sheets or plates, 3,651,200 pounds, valued at \$588,524; copper tubing, etc., 494,396 pounds, valued at \$102,402; and copper wire, 281,710 pounds, valued at \$56,588.



## COPPER.—TABLE 3.

## Exports of Copper in Ore, Matte, etc.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1885.....		262,600	1898.....	11,572,381	840,243
1886.....		249,259	1899.....	11,371,766	1,199,908
1887.....		137,966	1900.....	23,631,523	1,741,885
1888.....		257,260	1901.....	32,488,872	3,404,908
1889.....		168,457	1902.....	26,094,498	2,476,516
1890.....		398,497	1903.....	38,364,676	3,873,827
1891.....		348,104	1904.....	38,553,282	4,216,214
1892.....		277,632	1905.....	40,740,861	5,443,873
1893.....	4,792,201	269,160	1906.....	42,398,538	7,303,366
1894.....	1,625,389	91,917	1907.....	54,688,450	8,749,609
1885.....	3,742,352	236,965	1908.....	51,136,371	5,934,559
1896.....	5,462,052	281,070	1909.....	54,447,750	5,832,246
1897.....	14,022,610	850,336	1910.....	56,964,127	5,840,553

## COPPER.—TABLE 4.

## Imports of Pigs, Old, Scrap, etc.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	31,900	2,130	1896.....	86,905	9,226
1881.....	9,800	1,157	1897.....	49,000	5,449
1882.....	20,200	1,984	1898.....	1,050,000	80,000
1883.....	124,500	20,273	1899.....	1,655,000	246,740
1884.....	40,200	3,180	1900.....	1,144,000	180,990
1885.....	28,600	2,016	1901.....	951,500	152,274
1886.....	82,000	6,969	1902.....	1,767,200	325,832
1887.....	40,100	2,507	1903.....	2,038,400	252,594
1888.....	32,300	2,322	1904.....	2,115,300	270,315
1889.....	32,300	3,288	1905.....	1,944,400	268,548
1890.....	112,200	11,521	1906.....	2,627,700	441,854
1891.....	107,800	10,452	1907. (9 mos.).....	2,616,600	520,971
1892.....	343,600	14,894	1908.....	3,612,400	650,597
1893.....	168,300	16,331	1909.....	2,732,300	383,441
1894.....	101,200	7,397	1910.....	4,690,700	617,630
1895.....	72,062	6,770			
1910 { Copper, old and scrap or in blocks..... Duty free.			132,700 14,441		
Copper in pigs or ingots..... Duty free.			4,558,000 603,189		
Total 1910.....			4,690,700 617,630		

COPPER.—TABLE 5.  
Imports of Manufactures.

Fiscal Year,	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	123,061	1891.....	563,522	1902.....	1,281,522
1881.....	159,163	1892.....	422,870	1903.....	1,291,635
1882.....	220,235	1893.....	458,715	1904.....	1,191,610
1883.....	247,141	1894.....	175,404	1905.....	1,775,881
1884.....	134,534	1895.....	251,615	1906.....	2,660,303
1885.....	181,469	1896.....	285,220	1907 (9 mos.)	2,545,600
1886.....	219,420	1897.....	264,587	1908.....	2,713,060
1887.....	325,365	1898.....	786,529	1909.....	2,086,205
1888.....	303,459	1899.....	551,586	1910.....	2,870,636
1889.....	402,216	1900.....	1,090,280		
1890.....	472,668	1901.....	951,045		

	Duty.	Lbs.	Value.
			\$
Copper in bars and rods, in coils, or otherwise, in lengths not less than 6 feet, unmanufactured....	Free.	15,068,100	2,052,416
Copper, in strips, sheets or plates, not planished or coated, etc.....	"	3,084,200	491,949
Copper tubing in lengths not less than 6 feet, and not polished, bent or otherwise manufactured....	"	462,111	94,924
Copper rollers, for use in calico printing.....	"		39,051
Copper and manufactures of;—			
Nails, tacks, rivets and burrs or washers.....	30 %		1,515
Wire, plain, tinned or plated.....	15 "	468,959	84,636
Wire cloth, etc.....	25 "		4,909
All other manufactures of, N.O.P.....	30 "		101,230
Total.....			2,870,630

### Nova Scotia.

No copper was produced during the year, development work only being done.

### Quebec.

The copper production of Quebec was as usual from the pyritic ores of the Eastern Townships. There was a slight decrease from 1909, the copper production for 1910 being 877,347 pounds, valued at \$111,757, representing the estimated recovery from 26,297 tons of ore and concentrates shipped containing some 1,486,967 pounds of copper.

Statistics of the copper production in this province since 1886 are shown in Table 6.

## COPPER.—TABLE 6.

## Quebec:—Production.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$.			\$
1886.....	3,340,000	367,400	1899.....	1,632,560	287,494
1887.....	2,937,900	330,514	1900.....	2,220,000	359,418
1888.....	5,562,864	927,107	1901.....	1,527,442	246,178
1889.....	5,315,000	730,813	1902.....	1,640,000	190,666
1890.....	4,710,606	741,920	1903.....	1,152,000	152,467
1891.....	5,401,704	695,469	1904.....	1,760,000	97,455
1892.....	4,883,480	564,042	1905.....	621,243	252,752
1893.....	4,468,352	480,348	1906.....	1,981,169	381,930
1894.....	2,176,430	208,067	1907.....	1,517,990	303,659
1895.....	2,242,462	241,288	1908.....	1,282,024	169,330
1896.....	2,407,200	261,903	1909.....	1,088,212	141,272
1897.....	2,474,970	279,424	1910.....	871,347	111,757
1898.....	2,100,235	252,658			

## Ontario.

There is as yet comparatively little copper production in this province besides that obtained from the nickel-copper ores of the Sudbury district. In 1910 productive operations were carried on at the Bruce mines and also by the Canadian Copper Company at the Creighton and Crean Hill mines, and by the Mond Nickel Company at Victoria mines.

The total production of nickel-copper ore in 1910 was 628,947 tons. There were produced during the year 35,033 tons of Bessemer matte, containing 9,630 tons of copper and 18,636 tons of nickel, the shipping value of the matte being approximately \$5,380,064.

Details of the production from these ores are given more completely, and in tabular form in the article on nickel, and also under smelter production, pages 37 and 38, to which reference may be made. Statistics of the copper production of Ontario since 1886 are given in Table 7.

## COPPER.—TABLE 7.

## Ontario:—Production.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1886.....	165,000	18,150	1899.....	5,723,324	1,007,877
1887.....	322,524	36,284	1900.....	6,740,058	1,091,215
1888.....	Nil.	Nil.	1901.....	8,695,831	1,401,507
1889.....	1,466,752	201,678	1902.....	7,408,202	861,278
1890.....	1,303,065	205,233	1903.....	7,172,533	949,285
1891.....	4,127,697	531,234	1904.....	4,913,594	630,070
1892.....	2,203,795	254,538	1905.....	8,779,259	1,368,686
1893.....	3,641,504	391,461	1906.....	10,638,231	2,050,838
1894.....	5,207,679	497,854	1907.....	14,104,337	2,821,432
1895.....	4,576,337	492,414	1908.....	15,005,171	1,981,883
1896.....	3,167,256	344,598	1909.....	15,746,699	2,044,237
1897.....	5,500,652	621,023	1910.....	19,259,016	2,453,213
1898.....	8,375,223	1,007,539			

## British Columbia.

According to the returns received from the British Columbia smelters, the total quantity of copper contained in matte, blister and copper sulphate produced in British Columbia smelters during 1910, and including an estimate of smelter recovery for the copper ores exported was 35,270,006 pounds, after deducting the amount of copper produced from foreign ores. The production in 1909 on a similar basis was 35,658,952 pounds, and in 1908, 37,041,115 pounds. Returns of smelter production in this province were not collected by this department previous to 1908, and a complete record of statistics of production on this basis is not available.

The production of copper in this province according to statistics collected and published by the Provincial Department of Mines, reached a total of 38,243,934 pounds in 1910, as compared with 45,597,245 pounds in 1909. The apparently heavy decrease in 1910, is accounted for by the allowance of five pounds of copper per ton of ore for loss in slags, the figures being based on the assay content or total gross contents per lot, without other smelter and freight deductions. Statistics of the annual production since 1894, as ascertained by the Provincial Department of Mines, are shown in Table 8, and by districts since 1906, in Table 9.

According to direct returns in 1910, the ores of the Boundary district produced about 84.4 per cent of the total, the Rossland mines about 7.5 per cent, and the Coast district 7.6 per cent.

## COPPER.—TABLE 8.

## British Columbia:—Copper, Content of Ores Shipped.†

Calendar Year.	Copper contained in ores, shipped	Increase.		Value.
	Lbs.	Lbs.	%	
1894	324,680			\$ 31,039
1895	952,840	628,160	193	102,526
1896	3,818,556	2,865,716	301	415,459
1897	5,325,180	1,506,624	39	601,213
1898	7,271,678	1,946,498	36	874,783
1899	7,722,591	450,913	6	1,359,948
1900	9,977,080	2,254,489	29	1,615,289
1901	27,603,746	17,626,666	177	4,448,896
1902	29,636,057	2,032,311	7	3,445,488
1903	34,359,921	4,723,864	16	4,547,735
1904	35,710,128	1,350,207	3.7	4,579,110
1905	37,692,251	1,982,123	5.6	5,876,222
1906	42,990,488	5,298,237	14.1	8,287,706
1907	40,832,720	*2,157,768	*5.02	8,168,177
1908	47,274,614	6,441,894	15.8	6,244,031
1909	45,597,245	*1,677,369	*3.6	5,918,522
1910	38,243,934			4,871,512

\* Decrease.

† As published by British Columbia Bureau of Mines.

## COPPER.—TABLE 9.

## British Columbia:—Production\* by Districts.

	1905.	1906.	1907.	1908.	1909.	1910.†
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Cassiar		293,269	674,887	490,873	137,651	
East Kootenay	10,606	6,910				
West Kootenay—						
Nelson	92,663	216,034	434,222	53,243	186,572	231,936
Slocan		2,861				
Trail Creek	5,800,294	4,750,110	5,080,275	5,042,244	3,509,909	3,577,745
All other		1,145				
Yale—						
Boundary	27,670,644	32,226,782	31,521,550	40,178,521	40,603,042	31,354,985
Ashcroft, Kamloops	680,808	355,377	38,706	3,269		1,178
Coast Districts	3,437,236	5,138,000	3,083,080	1,506,464	1,160,071	3,078,090
	37,692,251	42,990,488	40,832,720	47,274,614	45,597,245	38,243,934

\* Copper contents of ores shipped.

† After deducting five pounds of copper per ton of ore for slag losses.

The low grade ores of the Boundary district, in addition to being self-fluxing, are remarkably uniform in character, ranging from 1 to 2 per cent in copper, and from \$1 to \$2 in gold and silver. In this district the greater part of the production has been obtained from the production of the four



principal companies: The Granby Consolidated Mining, Smelting and Power Company, Limited; The British Columbia Copper Company, Limited; The Consolidated Mining and Smelting Company of Canada, Limited, and the New Dominion Copper Company, Limited. The last named is controlled by the British Columbia Copper Company, the announcement being made early in the year. Each of the three first named companies is operating its own smelter, and the first two convert their matte into blister copper.

The approximate ore shipments during 1910, and the total shipments of the chief producers to the end of 1910, were as follows:—

	1910	Total.
Granby Consolidated Mining, Smelting and Power Co., Ltd.....	1,100,000	6,810,000
British Columbia Copper Company, Ltd.....	380,000	2,385,000
Dominion Copper Company, Ltd.....	53,000	648,000
Consolidated Mining and Smelting Co., Ltd. (Snowshoe).....	144,000	583,000

The Granby Company's mines at Phenix are equipped for a daily output of about 5,000 tons. At the company's smelter at Grand Forks, about 1,100,000 tons of ore were treated during the year 1910, producing about 20,000,000 pounds of copper. There was a considerable falling off owing to the destruction by fire of part of the headworks at the mine. The cost of production, refining and marketing per pound of fine copper after crediting expenditure with the value of the gold and silver recovered from the ore, was estimated at 9.624 cents.

Statistics of the smelter production will be found on page 41.

Next to the Boundary, Rossland is the most important copper producing district. Gold is the chief element of value in this camp, although copper is of considerable importance. The average tenor of the Rossland ores is shown in a table to be found under the heading gold. The principal operating companies were:—

The Consolidated Mining and Smelting Company of Canada, Limited, operating the Centre Star group, consisting of the Centre Star, War Eagle, Idaho, Iron Mask, and other claims from which were shipped about 191,618 tons of ore during the year.

The Le Roi Mining Company, Limited, shipped from the Le Roi mine 13,997 tons. This company is now in liquidation.

The shipments from the Le Roi Number Two, Limited, Josie mine, were 30,261 tons of ore and 1,431 tons of concentrates derived from the milling of 16,861 tons of second grade ore.

Shipments were also made from the Velvet-Portland and Nickel Plate mines.

In the Coast district production was limited to the Britannia mine of the Britannia Mining and Smelting Company; the Marble Bay mine, of the Tacoma Steel Company; the Cornell mine of the Northern Texada Mines

Company, now leased to the Tyee Copper Company, and the St. Joseph mine of the Lasqueti Island Mining Company. In addition, there were a few small shipments for sampling purposes.

No shipments were made from the Ikeda mines, on Moresby Island. The Hidden Creek Mining Company's property on Observatory Inlet was bonded during the year to the Granby Consolidated Mining, Smelting and Power Company.

### **Yukon District.**

From this district, according to returns from the White Pass and Yukon Railway, some 4,700 tons of copper ores were shipped containing, it is estimated, some 286,000 pounds of copper.

## GOLD.

*Refined Metal.*—Gold bullion is received, assayed and purchased at the Assay Office in Vancouver, operated in connection with this Department, the bullion being resold. The total quantity of bullion thus received during the twelve months ending December 31, 1910, was 45,228.92 ounces, being the weight after melting, valued at \$746,101.92, after deducting assay charges.

A refinery has been erected at the Royal Mint at Ottawa, and small shipments of gold have been received from different provinces, but at present the greater part of the Canadian gold finds its way to the United States refineries or to the United States Mint.

There is but one other refinery in Canada producing fine gold: that at Trail, established in 1904, operated by the Consolidated Mining and Smelting Company of Canada, Limited, the annual output of which in ounces of fine gold for the years 1904-1910 is shown below. The gold is recovered from the ores treated in the lead furnaces.

### Production of Refined Gold at Trail, B.C.

Year.	Ozs.
1904.. . . . .	4,336
1905.. . . . .	8,602
1906.. . . . .	9,993
1907.. . . . .	10,395
1908.. . . . .	15,346
1909.. . . . .	18,241
1910.. . . . .	13,298

*Mine Production.*—The production of gold in Canada—made up of gold derived from alluvial workings, gold obtained from the crushing of free milling quartz ores and the gold obtained from other metalliferous ores sent to copper and lead smelters, &c.—reached a total, in 1910, of 493,707 fine ounces, valued at \$10,205,835, as compared with 453,865 fine ounces, valued at \$9,382,230, produced in 1909, an increase of 39,842 ounces in quantity and \$823,605 in value, or 8.78 per cent.

The production by provinces in 1908, 1909 and 1910, is shown in Table 1 as follows:—

## GOLD.—TABLE 1.

## Production by Provinces 1908 1909 and 1910.

	1908.		1909.		1910.	
	Ozs. (fine ‡)	Value.	Ozs. (fine ‡)	Value.	Ozs. (fine ‡)	Value.
		\$		\$		\$
Nova Scotia.....	(b) 11,842	244,799	10,193	210,711	7,928	163,891
Quebec.....	(b) .....	.....	193	3,990	124	2,565
Ontario.....	(b) 3,212	66,389	1,569	32,425	3,089	63,849
Alberta.....	(a) 50	1,037	25	525	89	1,850
British Columbia..	(c) 286,858	5,929,880	250,320	5,174,579	261,386	5,403,318
Yukon.....	(a) 174,150	3,600,000	191,565	3,960,000	221,091	4,570,362
Totals....	476,112	9,842,105	453,865	9,382,230	493,707	10,205,835

† Calculated from the value : one dollar = 0.048375 ozs.

(a) Placer gold.

(b) Gold from vein mining.

	1908	1909	1910
(c) As follows : Gold from placer mining . . . . .	\$647,000	\$477,000	\$540,000
"      vein      " . . . . .	\$5,282,880	\$4,697,579	\$4,863,318
	\$5,929,880	\$5,174,579	\$5,403,318

The exact value of fine gold is  $\frac{800}{387}$  dollars per ounce equivalent to \$20.671834. (United States Standard).

In most cases, statistics of gold production are stated as crude bullion with value thereof. The fine ounces given in the tables in this report are calculated from the values by multiplying these by  $\frac{387}{800}$  or 0.48375.

Of the total production in 1910, about \$5,091,850 or 49.9 per cent is to be attributed to alluvial workings, \$680,349 or 6.7 per cent derived from stamp milling and \$4,433,628 or 43.4 per cent obtained from ores sent to the smelters. There was a general increase in all the provinces except Quebec and Nova Scotia, which show a falling off.

Statistics of the annual gold production of Canada are shown in Table 2.

## GOLD.—TABLE 2.

## Annual Production in Canada, 1858—1910.

Calendar Year.	Ozs. (fine.†)	Value.	Calendar Year.	Ozs. (fine.†)	Value.
		\$			\$
1858.....	34,104	705,000	1885.....	55,575	1,148,829
1859.....	78,129	1,615,072	1886.....	70,782	1,463,196
1860.....	107,806	2,228,543	1887.....	57,460	1,187,804
1861.....	128,973	2,666,118	1888.....	53,145	1,098,610
1862.....	135,391	2,798,774	1889.....	62,653	1,295,159
1863.....	202,498	4,186,011	1890.....	55,620	1,149,776
1864.....	199,605	4,126,199	1891.....	45,018	930,614
1865.....	192,898	3,987,662	1892.....	43,905	907,601
1866.....	152,555	3,153,597	1893.....	47,243	976,603
1867.....	145,775	3,013,431	1894.....	54,600	1,128,688
1868.....	134,169	2,773,527	1895.....	100,798	2,083,674
1869.....	102,720	2,123,405	1896.....	133,262	2,754,774
1870.....	83,415	1,724,348	1897.....	291,557	6,027,016
1871.....	105,187	2,174,412	1898.....	666,386	13,775,420
1872.....	90,283	1,866,321	1899.....	1,028,529	21,261,584
1873.....	74,346	1,536,871	1900.....	1,350,057	27,908,153
1874.....	97,856	2,022,862	1901.....	1,167,216	24,128,503
1875.....	130,300	2,693,533	1902.....	1,032,161	21,336,657
1876.....	97,729	2,020,233	1903.....	911,559	18,843,590
1877.....	94,304	1,949,444	1904.....	796,374	16,462,517
1878.....	74,420	1,538,394	1905.....	684,951	14,159,195
1879.....	76,547	1,582,358	1906.....	556,415	11,502,120
1880.....	63,121	1,304,824	1907.....	405,517	8,382,780
1881.....	63,524	1,313,153	1908.....	476,112	9,842,105
1882.....	60,288	1,246,268	1909.....	453,865	9,382,230
1883.....	53,853	1,113,246	1910.....	493,707	10,205,835
1884.....	51,202	1,058,439			
				13,925,465	287,864,988

†Calculated from the value: one dollar=0.048375 ounces.

It will be observed that previous to 1897 the production only twice exceeded \$4,000,000, the maximum during the period being, in 1863, when the output reached \$4,186,011. The discovery in 1896 of the rich placer deposits of the Yukon, however, caused a rapid increase in the production for the next four years, a record maximum being reached in 1900, when the total was only a little less than \$28,000,000. The following year showed a falling off in the Yukon output, as did each succeeding year till 1908. The Yukon production in 1909 and 1910 has shown an increase, and the total for Canada seems to have an upward tendency.

## Nova Scotia.

The gold production of Nova Scotia which is derived almost entirely from quartz ores, was 7,928 fine ounces, valued at \$163,891.

The principal operators in 1910 were:—

Ophir Gold Mining Company, Brookfield.

Consolidated Mines Company of Canada, Limited, Moose River.

M. J. O'Brien (Touquoy), Moose River.

Caribou Gold Mines, Ltd., Caribou.

Malcolm McLeod et al, Fifteen-Mile Stream.



Uniac Mines & Power Co., Gold River.  
 Chester Basin Gold Syndicate, Gold River.  
 Kempt Gold Mining Co., Kemptville.  
 M. J. O'Brien (Klondyke), Killag.  
 Ponhook Mining Co., Malaga.  
 Nova Scotia Gold Mines, Montague.  
 S. A. Heisler et al, Montague.  
 Oldham Mining Co., Oldham.  
 Greenough Brothers, Oldham.  
 M. J. O'Brien (Pictou Development Co.), Renfrew.  
 Eagle Mining Co., (Dufferin Mines), Salmon River.  
 New England Mining Co., Tangier.  
 Dominion Mining Co., Tangier.  
 Great Bras d'Or Gold Mining Co., Middle River.  
 Alhambra Mining Co., McKay Settlement.  
 E. E. Fraser, Mooselands.  
 West Gore Antimony Co., West Gore.  
 Petpeswick Mining Co., Lake Catcha.  
 Dreadnought Mining Co., Carleton.  
 H. C. Borden et al, Fifteen-Mile Brook.

Statistics of the annual production since 1862 are shown in Table 3, and the production of gold by districts during the twelve months ending September 30, 1910, as collected and published by the Provincial Mines Department, in Table 4, while the total production from 1862 to 1910, by districts, according to the same authority, is shown in Table 5.

## GOLD.—TABLE 3.

## Nova Scotia:—Annual Production.

	Tons Treated.	Ozs. (fine).	Value.	Yield of Gold per ton.		Tons Treated.	Ozs. (fine).	Value.	Yield of Gold per ton.
			\$	\$				\$	\$
1862..	6,473	6,863	141,871	21·91	1887..	32,280	20,009	413,631	12·81
1863..	17,000	13,180	272,448	16·02	1888..	36,178	21,137	436,939	12·08
1864..	21,431	18,883	390,349	18·21	1889..	39,160	24,673	510,029	13·02
1865..	24,421	24,011	496,357	20·32	1890..	42,749	22,978	474,990	11·11
1866..	32,157	23,776	491,491	15·28	1891..	36,351	21,841	451,503	12·42
1867..	31,384	25,763	532,563	16·96	1892..	32,552	18,865	389,965	11·98
1868..	32,259	19,377	400,555	12·41	1893..	42,354	18,436	381,095	8·99
1869..	35,144	16,855	348,427	19·91	1894..	55,357	18,834	389,338	7·04
1870..	30,824	18,740	387,392	12·56	1895..	60,600	21,919	453,119	7·47
1871..	30,787	18,139	374,972	12·17	1896..	69,169	23,876	493,568	7·13
1872..	17,089	12,352	255,349	14·94	1897..	73,192	27,195	562,165	7·68
1873..	17,708	11,180	231,122	13·05	1898..	82,747	26,054	538,590	6·50
1874..	13,844	8,623	178,244	12·87	1899..	112,226	29,876	617,604	5·50
1875..	14,810	10,576	218,629	14·76	1900..	87,890	28,955	598,553	6·85
1876..	15,490	11,300	233,585	15·08	1901..	91,948	26,459	546,963	5·32
1877..	17,369	15,925	329,205	18·95	1902..	93,042	30,348	627,357	6·68
1878..	17,989	11,864	245,253	13·63	1903..	103,856	25,533	527,806	5·08
1879..	15,936	12,950	268,328	16·83	1904..	45,436	10,362	214,209	4·71
1880..	13,997	12,472	257,823	18·42	1905..	57,774	13,707	283,353	4·90
1881..	16,556	10,147	209,755	12·66	1906..	66,059	12,223	252,676	3·82
1882..	21,081	13,307	275,090	13·04	1907..	58,550	13,675	282,686	4·82
1883..	25,954	14,571	801,207	11·60	1908..	61,536	11,842	244,799	3·97
1884..	25,186	15,168	313,554	12·44	1909..	56,790	10,193	210,711	3·71
1885..	28,890	20,945	432,971	14·98	1910..	43,006	7,928	163,891	3·81
1886..	29,010	22,038	455,564	15·70					
							875,956	18,107,644	

## GOLD.—TABLE 4.

Nova Scotia: District Details—Year ended Sept. 30, 1910.

District.	Tons Crushed.	Total Yield of Gold.			Average Yield of Gold per ton.		
		Ozs.	Dwts.	Grs.	Ozs.	Dwts.	Grs.
Stornont.....	36,978	4,075	12	1	.....	2	5
Wagamatcook.....	336	38	5	0	.....	2	7
Uniacke.....	62	36	16	0	.....	11	21
Gold River.....	250	227	18	19	.....	18	6
Caribou.....	409	270	10	0	.....	13	5
Caribou (Moose River).....	2,291	235	14	0	.....	2	1
Tangier.....	3,115	875	2	0	.....	5	15
Oldham.....	1,616	2,936	6	0	.....	16	8
Brookfield.....	90	23	2	12	.....	5	3
Fifteen Mile Stream.....	180	148	18	0	.....	16	13
Fifteen Mile Brook.....	530	92	3	0	.....	3	11
Kemptonville.....	52	52	6	0	.....	1	0
Killag.....	74	59	13	0	.....	16	3
Malaga Barrens.....	776	326	12	6	.....	8	10
Montague.....	304	161	6	1	.....	10	15
Renfrew.....	1,834	624	10	0	.....	6	19
Salmon River.....	236	55	15	0	.....	4	17
Sherbrooke.....	221	84	11	0	.....	7	16
McKay Settlement.....	1	.....	8	10	.....	8	10
West Gore (Gold in concentrates)....	49,355	10,325	9	1	.....	4	4
	203	350	4	15		14	12
	49,558	10,675	13	16	.....	4	7

GOLD.—TABLE 5.

## Nova Scotia:—Production of Gold from 1862 to 1910.

District.	Tons Crushed.	Total Yield of Gold.			Average Yield of Gold.			Value at \$19 per oz.
		Ozs.	Dwts.	Grs.	Ozs.	Dwt.	Grs.	
*Caribou and Moose River..	216,242	57,785	12	22	.....	5	8	1,097,928
Montague.....	29,482	42,149	1	6	.....	8	14	800,832
Oldham.....	58,026	66,936	18	21	.....	3	2	1,271,802
Renfrew.....	54,918	45,798	17	19	.....	16	16	870,179
Sherbrooke.....	300,213	153,086	12	4	.....	10	5	2,908,646
Stormont.....	515,241	117,128	12	18	.....	4	13	2,225,444
Tangier.....	55,060	25,322	13	19	.....	9	5	481,131
†Uniacke.....	63,331	43,982	17	17	.....	13	21	835,675
Waverley.....	155,520	69,980	10	16	.....	9	0	1,329,650
Brookfield.....	93,527	38,709	2	2	.....	8	7	735,473
‡Salmon River.....	118,819	41,852	5	20	.....	7	1	795,193
Whiteburn.....	6,907	9,800	0	2	.....	8	9	186,200
§ Lake Catcha.....	27,202	26,986	5	23	.....	19	20	512,740
¶ Rawdon.....	12,189	9,606	5	10	.....	15	18	182,519
Wine Harbour.....	77,396	34,992	15	11	.....	9	1	664,863
Fifteen mile stream..	36,636	17,207	13	5	.....	9	9	326,945
Malaga.....	22,693	20,235	17	18	.....	17	20	384,482
Other districts.....	142,476	74,610	7	7	.....	10	11	1,417,597
	1,985,878	896,172	11	0	.....	8	20	17,027,279
Not included in above } gold extracted from 1905	527	1,232	16	23	.....	6	19	23,424
or contained in stib- 1906	783	1,031	13	11	.....	6	8	19,602
nite oreshipped from 1907	1,403	1,319	18	12	.....	18	19	25,078
West Gore, as per 1908	133	179	5	0	.....	6	23	3,406
returns..... 1909					.....			
..... 1910	203	350	4	15	.....	14	12	6,654
Total.....	1,988,927	900,286	9	13	.....			17,105,443

\* From 1869. † From 1866. ‡ From 1883. || From 1887. § From 1882. ¶ From 1887  
|| From 1883.

The following notes with respect to operations during 1910, are taken from the report of the Provincial Department of Mines:—

“The decline in the gold mining industry must be attributed to not one or two, but a combination of causes, of which insufficient capital, scarcity of good labour, past wild-catting, unintelligent direction of operations, cost of fuel and lack of prospecting, take important places.

“The cessation of work at the Richardson mine at Goldboro, due indirectly to a ‘cave’ which took place in the old workings, marks the closing of what has been in recent years the largest producer of gold, and the largest employer of men, among the gold mines of the province, and has produced, during the 18 years it has been operated, 52,333 ounces of gold, valued at \$994,427 from 395,661 tons of ore mined and milled.

“At Moose River, Renfrew and Killag, extensive prospecting and development work has been carried on by Mr. M. J. O’Brien. Large mill tests have been taken and crushed from different leads at these districts, and some very satisfactory values recovered.

"In the districts of Tangier, Lake Catcha and Gold River, development and preparatory work has been carried on, though little or no ore has yet been crushed.

"The number of men employed during the year was 400."

### Quebec.

The production of gold reported from this province since 1903 has been almost entirely from the pyritic ores mined at Capelton and Eustis in the Eastern Townships. Very little gold has been obtained from the alluvial deposits of the St. Francis, Chaudière and Gilbert rivers since 1894, when the output was returned as \$29,106.

GOLD.—TABLE 6.

### Quebec:—Annual Production.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		\$			\$
1877.....	583	12,057	1895.....	62	1,281
1878.....	868	17,937	1896.....	145	3,000
1879.....	1,160	23,972	1897.....	44	900
1880.....	1,605	33,174	1898.....	295	6,089
1881.....	2,741	56,661	1899.....	238	4,916
1882.....	827	17,093	1900.....	Nil.	Nil.
1883.....	860	17,787	1901.....	145	3,000
1884.....	422	8,720	1902.....	391	8,073
1885.....	103	2,120	1903.....	180	3,712
1886.....	193	3,981	1904.....	140	2,900
1887.....	78	1,604	1905.....	191	3,940
1888.....	181	3,740	1906.....	165	3,412
1889.....	58	1,207	1907.....	Nil.	Nil.
1890.....	65	1,350	1908.....	Nil.	Nil.
1891.....	87	1,800	1909.....	193	3,990
1892.....	628	12,987	1910.....	124	2,565
1893.....	759	15,696			
1894.....	1,412	29,106		14,943	309,490

\* Calculated from the value: one dollar=0.048375 ozs.

### Ontario.

The chief producers in 1910 were:—

The Canadian Exploration Co., Ltd., operating the Long Lake mine, Sudbury district.

The Havilah Gold Mines, Ltd., Ophir Mine, Algoma district.

Kenora Mines, Ltd., Mikado Mine, near Kenora.

Dome Mines Co., Ltd., Dome Mine, Porcupine district.

Hollinger Gold Mines, Ltd., Hollinger Mine, Porcupine district.

There has been renewed activity during the year in the Rainy River district, consequent partly to the discovery of the gold ores in the Porcupine dis-



trict of Northern Ontario. The production of the Porcupine mines was over 50 per cent of the provincial output. Statistics of production of gold in Ontario since 1887 are shown in Table 7, following:—

GOLD.—TABLE 7.

## Ontario:—Annual Production.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		\$			\$
1887.....	327	6,760	1900.....	14,391	297,495
1888.....	Nil.	Nil.	1901.....	11,844	244,837
1889.....	Nil.	Nil.	1902.....	11,118	229,828
1890.....	Nil.	Nil.	1903.....	9,076	188,036
1891.....	97	2,000	1904.....	1,935	40,000
1892.....	344	7,118	1905.....	4,402	91,000
1893.....	708	14,637	1906.....	3,202	66,193
1894.....	1,917	39,624	1907.....	3,212	66,399
1895.....	3,015	62,320	1908.....	3,212	66,389
1896.....	5,563	115,000	1909.....	1,569	32,425
1897.....	9,157	189,294	1910.....	3,089	63,849
1898.....	12,863	265,889			
1899.....	20,394	421,591			
				121,455	2,510,684

\* Calculated from the value, one dollar=0.048375 ozs.

## Alberta.

The value of gold derived from the placer deposits of the Saskatchewan river was, in 1909, \$525, and in 1910, \$1,850.

Statistics of the production of gold from the Saskatchewan river since 1887 are shown in Table 8.

GOLD.—TABLE 8.

## Alberta:—Annual Production.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		\$			\$
1887.....	102	2,100	1900.....	242	5,000
1888.....	58	1,200	1901.....	726	15,000
1889.....	967	20,000	1902.....	484	10,000
1890.....	193	4,000	1903.....	48	1,000
1891.....	266	5,500	1904.....	24	500
1892.....	508	10,506	1905.....	121	2,500
1893.....	466	9,640	1906.....	39	800
1894.....	726	15,000	1907.....	33	675
1895.....	2,419	50,000	1908.....	50	1,037
1896.....	2,661	55,060	1909.....	25	525
1897.....	2,419	50,000	1910.....	89	1,850
1898.....	1,209	25,000			
1899.....	726	15,000			
				14,601	301,833

\* Calculated from the value, one dollar=0.048375 ozs.

### British Columbia.

The gold production of British Columbia in 1910, as reported to the department, amounted to \$5,403,318, comprising placer gold \$540,000, bullion from milling ores \$432,247, smelter recoveries \$4,431,071.

The placer production is as published by the Provincial Mining Bureau. The statistics for lode gold represent as closely as can be ascertained the actual gold recovery based on smelter recoveries and bullion shipments. This production is less than that published by the Provincial Bureau of Mines, which for lode gold is based on the gold content of ores shipped to smelters, &c. According to this authority the production for 1910 was \$6,073,380, as compared with \$5,401,090 in 1909, an increase of \$672,290.

In lode mining, there were increases in the Nelson, Trail Creek and Boundary districts, while there was a slight decrease in the Coast gold production.

In alluvial gold recovery a slight but fairly general increase was shown.

Of the 1910 production, 10 per cent was from alluvial workings; 8 per cent from free milling ores and 82 per cent from ores sent to the smelters.

Statistics of the production by districts in 1910, as published by the Provincial Department of Mines, are shown in Table 9, while the total annual production since 1858 is given in Table 10.

GOLD.—TABLE 9.

#### British Columbia:—Production by Districts, \* 1910.

Districts.	GOLD : PLACER.		GOLD : LODGE.	
	Ozs.	Value.	Ozs.	Value.
		\$		\$
Cariboo :—				
Cariboo . . . . .	10,900	218,000	.....	.....
Quesnel . . . . .	300	6,000	.....	.....
Omineca . . . . .	750	15,000	.....	.....
Cassiar :—				
Atlin . . . . .	13,750	275,000	.....	.....
All other . . . . .	400	8,000	.....	.....
East Kootenay :—				
Fort Steele . . . . .	150	3,000	.....	.....
Others . . . . .	.....	.....	.....	.....
West Kootenay :—				
Ainsworth . . . . .	.....	.....	71	1,468
Nelson . . . . .	100	2,000	36,834	761,359
Slocan . . . . .	.....	.....	101	2,088
Trail Creek . . . . .	.....	.....	119,277	2,465,455
Others . . . . .	50	1,000	418	8,640
Lillooet . . . . .	350	7,000	137	2,832
Yale :—				
Grand Forks . . . . .	50	1,000	105,294	2,176,427
Similkameen . . . . .	50	1,000	.....	.....
Yale . . . . .	100	2,000	.....	.....
Coast, and all others . . . . .	50	1,000	5,569	115,111
	27,000	540,000	267,701	5,533,380

\* From Annual Report of the Minister of Mines for British Columbia.

## GOLD.—TABLE 10.

## British Columbia:—Annual Production.

Calendar Year.	Ozs. (fine‡).	Value.	Calendar Year.	Ozs. (fine‡).	Value.
		\$			\$
1858.....	34,104	705,000	1885.....	34,527	713,738
1859.....	78,129	1,615,072	1886.....	43,714	903,651
1860.....	107,806	2,228,543	1887.....	33,558	693,709
1861.....	128,973	2,666,118	1888.....	29,834	616,731
1862.....	128,528	2,656,903	1889.....	28,489	588,923
1863.....	189,318	3,913,563	1890.....	23,918	494,436
1864.....	180,722	3,735,850	1891.....	20,792	429,811
1865.....	168,887	3,491,205	1892.....	19,327	399,525
1866.....	128,779	2,662,106	1893.....	18,360	379,535
1867.....	120,012	2,480,868	1894.....	25,664	530,530
1868.....	114,792	2,372,972	1895.....	61,289	1,266,954
1869.....	85,865	1,774,978	1896.....	86,504	1,788,206
1870.....	64,675	1,336,956	1897.....	131,805	2,724,657
1871.....	87,048	1,799,440	1898.....	142,215	2,939,852
1872.....	77,931	1,610,972	1899.....	203,295	4,202,473
1873.....	63,166	1,305,749	1900.....	228,916	4,732,105
1874.....	89,233	1,844,618	1901.....	257,292	5,318,703
1875.....	119,724	2,474,904	1902.....	288,383	5,961,409
1876.....	86,429	1,786,648	1903.....	284,108	5,873,036
1877.....	77,796	1,608,182	1904.....	275,975	5,704,908
1878.....	61,688	1,275,204	1905.....	285,529	5,902,402
1879.....	62,407	1,290,058	1906.....	269,886	5,579,039
1880.....	49,044	1,013,827	1907.....	234,216	4,883,020
1881.....	50,636	1,046,737	1908.....	286,858	5,929,880
1882.....	46,154	954,085	1909.....	250,320	5,174,579
1883.....	38,422	794,252	1910.....	261,386	5,403,318
1884.....	35,612	736,165			
				6,304,040	130,316,105

‡ Calculated from the value : one dollar = 0·048375 ozs.

The placer and hydraulic mining situation shows little change from 1909. There appears to have been a slight general increase, many of the larger companies being still engaged in constructive work. A shortage of water also interfered with the clean up.

Of the lode gold production 44·6 per cent was derived from the Rossland camp in 1910, compared with 48·3 in 1909. The principal companies carrying on active operations during 1910 were as follows:—

The Consolidated Mining and Smelting Company of Canada, Limited, with total shipments of 191,618 tons.

The Le Roi Mining Company, Limited, shipping 13,997 tons. This company has gone into voluntary liquidation.

The Le Roi No. 2 Mining Company, Limited, shipping 30,000 tons of first class ore and 1,431 tons of concentrates, which were produced from the milling of 16,861 tons of second class ore.

Several of the smaller properties of the camp were actively operated during the year.

The following table shows the production of the Rossland mines since 1894, and illustrates the average results attained during each of the past seventeen years.

**Ore Shipments, Total Metallic Contents, and Average Metallic Contents per Ton from Rossland Mines, as determined from Smelter Returns.\***

Year.	Ore, tons 2,000 lbs.	Gold.		Silver.		Copper.		Total.	Value per ton.
		Ozs.	Ozs. per ton.	Ozs.	Ozs. per ton.	Lbs.	Per cent	\$	\$ c.
1894.....	1,856	3,723	2'000	5,357	2'890	106,229	2'850	75,510	40 69
1895.....	19,693	31,497	1'600	46,702	2'410	840,420	2'100	702,459	35 67
1896.....	38,075	55,275	1'450	89,285	2'340	1,580,635	2'080	1,243,360	32 65
1897.....	68,804	97,024	1'420	110,068	1'600	1,819,586	1'320	2,097,280	30 48
1898.....	111,282	87,343	0'780	170,804	1'540	5,232,011	2'350	2,470,811	22 10
1899.....	172,665	102,976	0'596	185,818	1'070	5,693,889	1'650	3,229,086	18 70
1900.....	217,636	111,625	0'513	167,378	0'769	2,071,865	0'476	2,739,300	12 58
1901.....	283,360	132,333	0'467	970,460	3'424	8,333,446	1'470	4,621,299	16 31
1902.....	329,534	162,146	0'492	373,101	1'132	11,667,807	1'770	4,893,395	14 85
1903.....	360,786	145,353	0'403	209,537	0'581	8,652,127	1'199	4,255,958	11 80
1904.....	312,991	133,095	0'425	181,830	0'581	7,119,876	1'137	3,760,866	12 01
1905.....	330,618	129,843	0'393	147,753	0'447	5,800,294	0'877	3,672,828	11 11
1906.....	279,527	105,356	0'377	126,174	0'451	4,750,110	0'850	1,173,587	11 35
1907.....	285,923	94,573	0'331	126,661	0'443	5,080,275	0'888	3,049,485	10 67
1908.....	302,419	142,314	0'471	129,558	0'428	5,042,244	0'834	3,672,270	12 14
1909.....	237,656	115,653	0'487	80,026	0'336	3,509,909	0'750	2,874,956	12 10
1910.....	253,471	119,277	0'471	87,833	0'347	3,577,745	0'708	2,965,818	11 70

\* From the annual reports of the Minister of Mines for British Columbia.

The Boundary district comes next in gold production, and is credited with \$2,176,427 in 1910, an increase of 12.9 per cent over 1909. The output is largely due to the large tonnage of copper ores mined in this district. These ores will average in gold only from 0.04 to 0.05 ounces per ton, but over 1,700,000 tons were mined in 1910. Included in this district is the Osoyoos Mining Division, in which is situated the Nickel Plate mine at Hedley, operated by the Hedley Gold Mining Company. In its report for 1910, the following details of interest are given: "Lineal feet of development in 1910, 1,705, being made up of drifting 905 feet, sinking 520 feet, raises 280 feet; tons milled 46,828, assay value \$11.46 to \$14.03 per ton; recoveries, \$519,356.46; estimated value of sand and slimes impounded for retreatment, \$84,000; expenditures, \$255,369.98; profit, \$263,986.48."

Nelson mining division had another season of activity in its various camps. The ore is in most cases free-milling, and several of the mines treat the ore in stamp mills producing bullion and concentrates. Others ship direct to the smelter.

There was a decrease of production in the Coast district.

### Yukon.

The production of the Yukon in 1910, was \$4,570,362, as compared with \$3,960,000 in 1909, an increase of \$610,362 or 15.42 per cent. In this is included \$20,362 production from lode mines in the district. The statistics of the production of gold in the Yukon district during the years between 1898 and 1906, as given in Table 11, are based primarily on the receipts of gold at the United States mints and receiving offices and credited to the Canadian



Yukon. Although a royalty was exacted on the gold output, it seems certain that particularly during the years of high production, considerable amounts of gold were produced which escaped royalty payment. During the past five years, however, the gold production of the Yukon, as ascertained by the Interior Department, and on which a royalty of  $2\frac{1}{2}$  per cent is imposed, has agreed fairly closely with the quantities reported at the United States receiving offices as having been derived from the Canadian Yukon. For the purpose of collecting the royalty, a fixed value of \$15 per ounce is placed upon the crude gold. The actual value of the gold will average somewhat higher than this, however. The average value of the deposits for a number of years as shown by the experience of the United States assay office has been about \$16.50 per ounce. At the Canadian assay office at Vancouver, B.C., there were deposited during the twelve months ending December 31, 1910, 3,594.87 ounces from the Yukon, valued, after all charges had been deducted, at \$62,094.09, showing an average value of about \$17.27 per ounce.

The production of crude placer gold in the Yukon during the past five years, as ascertained by the Department of the Interior, and upon which a royalty of  $2\frac{1}{2}$  per cent has been collected, is shown in the accompanying Table.

**Production of Crude Gold in the Yukon District.**

Month.	1906.	1907.	1908.	1909.	1910.
	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.
January.....	3,732.94	7,308.95	2,464.00	69.50	16.68
February.....	11,693.99	213.00	47.30	115.33	749.28
March.....	10.30	66.80	16.65	848.39	193.81
April.....	784.77	202.80	947.00	3.75	50
May.....	64,060.66	35,736.62	6,851.96	117.33	43.83
June.....	57,578.27	31,402.14	51,530.90	62,254.92	54,301.17
July.....	49,012.36	26,793.50	35,291.11	52,126.43	37,942.31
August.....	54,947.07	22,392.10	37,930.99	47,440.83	47,673.06
September.....	53,487.08	33,119.51	39,654.27	44,466.20	57,695.65
October.....	51,799.53	35,589.70	37,028.98	26,572.23	51,888.18
November.....	131.81	200.30	1,989.39	4,858.69	21,404.29
December.....	3,352.83	52.80	5,491.76	892.75	3,563.75
	350,391.61	193,078.22	219,244.31	239,766.35	275,472.51

In 1910 the placer production is estimated as \$4,550,000 in gold, representing 220,106 fine ounces of metal, and 50,000 fine ounces of silver, valued at \$26,743, being at the average price of fine silver for the year, making a total valuation of the Yukon placer output of \$4,576,743. In 1909 the placer production was estimated at \$3,960,000, representing 191,565 fine ounces of gold, and 45,000 fine ounces of silver, valued at \$23,176, making a total valuation of \$3,983,176.

Statistics of the annual production of gold in the district since 1885 are shown in Table 11.



## GOLD.—TABLE 11.

## Annual Production in Yukon.

Calendar Year.	Ozs. (fine†).	Value.	Calendar Year.	Ozs. (fine†).	Value.
		\$			\$
1885 }			1898 . . . . .	483,750	10,000,000
1886 }	4,387	100,000	1899 . . . . .	774,000	16,000,000
1887 . . . . .	3,386	70,000	1900 . . . . .	1,077,553	22,275,000
1888 . . . . .	1,935	40,000	1901 . . . . .	870,750	18,000,000
1889 . . . . .	8,466	175,000	1902 . . . . .	701,437	14,500,000
1890 . . . . .	8,466	175,000	1903 . . . . .	592,594	12,250,000
1891 . . . . .	1,935	40,000	1904 . . . . .	407,938	10,500,000
1892 . . . . .	4,233	37,500	1905 . . . . .	381,001	7,876,000
1893 . . . . .	8,514	176,000	1906 . . . . .	270,900	5,600,000
1894 . . . . .	6,047	125,000	1907 . . . . .	152,381	3,150,000
1895 . . . . .	12,094	250,000	1908 . . . . .	174,150	3,600,000
1896 . . . . .	14,513	300,000	1909 . . . . .	191,565	3,960,000
1897 . . . . .	120,937	2,500,000	1910* . . . . .	221,091	4,570,362
				6,594,473	136,319,862

† Calculated from the value: one dollar=0.048375 ozs.

\* Including a small production from lode mines.

Since 1898, a royalty to the extent of \$3,786,738 has been collected on the gold production of this district. The yearly amounts collected, as well as the annual production of gold as ascertained by the Interior Department, are shown in the accompanying table. The difference between these figures and those shown in Table 11, which are based on the mint receipts of Yukon gold has already been mentioned, and is probably due to two main factors: (1) the fixing of the value of the gold for royalty purposes at \$15 per ounce, a figure from \$1 to \$2 less than the actual value of the gold, and (2) the probability that in the earlier years of royalty collection considerable quantities of gold dust left the camp unrecorded and escaped royalty payment.

## Gold Production in the Yukon, and Royalty Collected.‡

Fiscal Year.	Total Gold Production.	Total Exemption.	Royalty Collected on.	Royalty Paid.
	\$	\$	\$	\$
1898 . . . . .	3,072,773	339,845	2,732,928	273,292
1899 . . . . .	7,582,283	1,699,657	5,882,626	588,262
1900 . . . . .	9,809,464	2,501,744	7,307,720	730,771
1901 . . . . .	9,162,082	1,927,666	7,236,522	592,660
1902 . . . . .	9,566,340	1,199,114	8,367,225	331,436
1903 . . . . .	12,113,015	.....	12,113,015	302,893
1904 . . . . .	10,790,663	.....	10,790,663	272,217
1905 . . . . .	8,222,054	.....	8,222,054	206,760
1906 . . . . .	6,540,007	.....	6,540,007	163,963
1907 (9 mos.) . . . . .	3,304,791	.....	3,304,791	82,622
1908 . . . . .	2,820,162	.....	2,820,162	70,505
1909 . . . . .	3,260,282	.....	3,260,282	81,507
1910 . . . . .	3,594,251	.....	3,594,251	89,844

‡ From the Report of the Yukon and Mining Lands Branch of the Department of the Interior

## IRON AND STEEL.

### INTRODUCTORY.

The iron and steel industry in Canada has had a fairly steady and continued development during the past few years. The serious depression under which this industry suffered in the United States in 1908 had comparatively little effect in Canada although there was a general falling off in output during that year. The production of 1909, however, greatly exceeded that of 1907, while the year 1910 again shows a very substantial increase in the production of pig iron and steel over the year 1909. The actual shipments of iron ore, however, from Canadian mines in 1910, were less than in 1909, although greater than the 1908 shipments.

The total shipments of iron ore from mines in Canada in 1910 were 259,418 short tons; there were used in blast furnaces 1,548,226 tons of iron ore, and in steel furnaces 39,332 tons; 800,797 tons pig iron were made, a large part of which was used directly in the manufacture of steel, and a total of 822,284 tons steel ingots and castings were made.

As has been pointed out in previous reports, the development of iron ore mining in Canada has not kept pace with the growth of the metallurgical industry in iron and steel. The rate of production of iron ore has shown practically no increase during the past ten years, while the production of pig iron during the same period has increased nearly eight fold.

About 11 per cent, only, of the iron ore used in Canadian blast furnaces during 1910, was of domestic origin; of the coke used 49 per cent was either imported or made from imported coal, and 18 per cent of the limestone flux used was from sources outside of Canada. It is evident that this industry is now to a very large extent dependent upon imported raw materials.

The total production of iron ore in Canada to the end of 1910 has probably only slightly exceeded 5,250,000 tons, while the total consumption of ore in blast furnaces since 1886 has been 11,732,336 tons. During 1910 the tonnage of imported ores used was 1,377,035 which was derived chiefly from Newfoundland and the south shore of Lake Superior.

The assistance granted by the Federal Government to the iron and steel industries in the form of bounties, ceased on December 31, 1910, with the exception of the bounty on steel rods which is being continued to June 30, 1911. The total amount of bounties paid from 1895 to December 30, 1910, was \$16,485,078.

The accompanying table gives a summary of the chief statistics of production of iron ore, pig iron, and steel, while more detailed records will be found in subsequent pages.

## Summary of Iron and Steel Statistics 1908, 1909, and 1910.

	1908.	1909.	1910.
	Tons.	Tons.	Tons.
Iron ore shipped.....	238,082	268,043	259,418
Canadian iron ore charged to blast furnaces.....	209,266	257,502	171,191
Imported iron ore charged to blast furnaces.....	1,051,445	1,235,000	1,377,035
Iron ore charged to steel furnaces.....	(a)	(a)	39,332
Pig iron made.....	630,835	757,162	800,797
Pig iron exported.....	290	5,063	9,763
Pig iron imported.....	58,365	148,338	243,859
Pig iron consumption (calculated).....	688,910	900,437	1,034,893
Pig iron used in steel furnaces.....	(a)	(a)	690,913
Steel ingots and castings made.....	588,763	754,719	822,284
Steel rails made.....	267,192	377,642	399,762
Canadian coke used in iron blast furnaces.....	492,076	412,016	491,281
Imported coke used in iron blast furnaces.....	325,670	507,255	476,838
Iron and steel imported..... (b)	1,079,000	565,740	979,939
Number of completed blast furnaces..... No.	16	16	17
Number of men employed in blast furnaces..... No.	1,380	1,486	1,403
Wages paid in blast furnaces..... \$	750,224	879,429	1,006,727
Value of pig iron produced..... \$	8,111,194	9,581,864	11,245,622
Value of iron and steel goods exported..... (c) \$	5,907,792	7,172,413	7,895,489
Value of iron and steel goods imported..... (d) \$	61,819,698	40,393,431	59,952,197

(a) Not collected.

(b) Figures cover the fiscal year ending March 31 and include all iron and steel goods for which weights are given. For details see Table 20.

(c) Figures cover the calendar year. For details see Table 19.

(d) Figures cover the fiscal year ending March 31. For details see Tables 21 and 22.

## IRON ORE.

The total shipments of iron ore from mines in Canada in 1910 were 259,418 tons valued at \$574,362 at the shipping point, as compared with 268,043 tons valued at \$659,316 in 1909, and 238,082 tons valued at \$568,189 in 1908. Of the 1910 production 130,380 tons are classed as hematite, 127,768 as magnetite, and 1,270 tons as bog ore. Ontario is the largest producer, having shipped 231,445 tons or nearly 90 per cent of the total production. New Brunswick enters the list of producers with shipments of 5,336 tons from the mines near Bathurst. In Nova Scotia 18,134 tons were shipped from the Torbrook mines and in Quebec province, in addition to the bog ores, a small tonnage (3,233 tons) of titaniferous iron sands was shipped from the north shore of the St. Lawrence. Although no production of iron ore is credited to British Columbia, a shipment of a small barge load of copper iron ore was made from the Raven mine, Texada island, to Seattle, Wash.

The production by provinces during the past three years, was as follows:—

IRON.—TABLE 1.

**Production of Iron Ore by Provinces, 1908-9-10.**

Provinces.	1908.		1909.		1910.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
New Brunswick.....					5,336	11,910
Nova Scotia.....	11,802	17,620			18,134	40,478
Quebec.....	10,103	22,094	4,150	5,508	4,503	8,252
Ontario.....	216,177	528,475	263,893	653,808	231,445	513,722
British Columbia.....						
	238,082	568,189	268,043	659,316	259,418	574,362

The production during 1909 and 1910 classed as magnetites (including titaniferous iron sands and some ores with an admixture of hematite), hematites (including brown ores), and bog ores, was as follows:—

IRON.—TABLE 2.

**Classified Production of Iron Ore, 1909-10.**

Character of Ore.	1909.			1910.		
	Short Tons.	Value.	Per Ton.	Short Tons.	Value.	Per Ton.
		\$	\$ cts.		\$	\$ cts.
Magnetite.....	74,240	162,280	2 19	127,768	289,876	2 27
Hematite.....	190,473	492,348	2 58	130,380	281,090	2 16
Bog.....	3,330	4,688	1 41	1,270	3,402	2 68
	268,043	659,316	2 46	259,418	574,362	2 21

A record of the production by provinces in past years is shown in Tables 3 and 4. There was a considerable production in Ontario previous to 1886 which is not recorded.



IRON.—TABLE 3.

## Production of Iron Ore by Provinces, 1886-1910.

Calendar Year.	New Brunswick.	Nova Scotia.	Quebec.	Ontario.	British Columbia.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1886.....		44,388		16,032	3,941	64,361
1887.....		43,532	13,404	16,598	2,796	76,330
1888.....		42,611	10,710	16,894	8,372	78,587
1889.....		54,161	14,533		15,487	84,181
1890.....		49,206	22,305			76,511
1891.....		53,649	14,380		950	68,979
1892.....		78,258	22,690		2,300	103,248
1893.....		102,201	22,076		1,325	125,602
1894.....		89,379	19,492		1,120	109,991
1895.....		83,792	17,783		1,222	102,797
1896.....		58,810	17,630	15,270	196	91,906
1897.....		23,400	22,436	2,770	2,099	50,705
1898.....		19,079	17,873	21,111	280	58,343
1899.....		28,000	19,420	25,126	2,071	74,617
1900.....		18,940	19,000	82,950	1,110	122,000
1901.....		18,619	15,489	272,538	7,000	313,646
1902.....		16,172	18,524	359,288	10,019	404,003
1903.....		40,335	12,035	209,634	2,290	264,294
1904.....		61,293	16,152	141,601		219,046
1905.....		84,952	12,681	193,464		291,097
1906.....		97,820	9,933	141,078		248,831
1907.....		89,839	12,748	207,769	2,500	312,856
1908.....		11,802	10,103	216,177		238,082
1909.....			4,150	263,893		268,043
1910.....	5,336	18,134	4,503	231,445		259,418

IRON.—TABLE 4.

## Production of Iron Ore in Nova Scotia, 1876-1885.

Calendar Year.	Tons.	Calendar Year.	Tons.
1876.....	15,274	1881.....	39,843
1877.....	16,879	1882.....	42,135
1878.....	36,600	1883.....	52,410
1879.....	29,889	1884.....	54,885
1880.....	51,193	1885.....	48,129

*Nova Scotia.*—The Torbrook mines were the only shippers during 1910, the quantity shipped being 18,134 tons in three cargoes to Philadelphia, Pa., Glasgow, Scotland, and Middlesborough, England, respectively. The ore is a hematite and the shipments averaged about 48 per cent metallic iron. The total quantity of ore mined during the year was 53,054 tons, a large part of which was in the stock piles at the close of the year.

Some development work was done at Arisaig, Antigonish county, by the Arisaig Iron Company, but no ore was shipped.



The blast furnaces at Sydney and North Sydney receive their ore supplies from Newfoundland chiefly. The two Canadian Companies operating at Wabana, shipped during the year 1,259,626 short tons of hematite ore averaging from 50 to 52 per cent iron: of which 808,762 tons were shipped to Sydney and 450,864 tons to the United States and Europe.

*New Brunswick.*—Shipments were made from the mines at Austin Brook, near Bathurst, to the extent of 5,336 tons, the ore being sent to Philadelphia. The ore is a magnetite with an intermixture of hematite, and the properties are being developed by the Canada Iron Corporation. About 24,515 tons of ore were mined during the year. Shipments are made from the Company's docks at Newcastle, at which there was a considerable tonnage in stock at the close of the year.

*Quebec.*—The iron ore production in Quebec in 1910 included 1,270 tons of bog ore shipped to Drummondville, and 3,233 tons of titaniferous magnetic sands shipped from St. Urbain, Champlain county, to the United States. In 1909 the shipments were 3,330 tons of bog ores and about 820 tons of titaniferous iron sands.

These titaniferous sands have been shipped largely for experimental purposes and a nominal value of \$1.50 per ton has been placed upon the production, although the actual cost of placing the ore on board vessels was possibly several times this amount.

*Ontario.*—Shipments were made by four mines in this Province during the year, viz.: the Mayo, at Bessemer, Hastings county; the Moose Mountain, at Sellwood, 30 miles north of Sudbury; the Helen, north of Michipicoten, and the Atikokan, 130 miles northwest of Port Arthur, on the Canadian Northern railway. In addition to these a considerable tonnage of ore was reported as having been raised at the Wilbur mine in Lanark county, but no shipments were made.

The total shipments of ore during the year were 231,445 tons, valued at \$513,722; as compared with shipments of 263,893 tons, valued at \$653,808, in 1909.

*British Columbia.*—No regular shipments of iron ore were reported from the Province. Some prospecting work was done on the Raven mine on Texada island, and a small scow load of cupriferous iron ore shipped to Seattle, Wash., for experimental purposes.

Following is a list of the principal producers of iron ore in Canada:—

Canada Iron Corporation, Limited, Mark Fisher Bldg., Montreal.

E. H. Duval, Levis, Que., (Guay P. O.).

H. C. Bosse, 92 St. Peter St., Quebec, Que.

Joseph Bouchard, Baie St. Paul, Que.

The Canadian Iron Ore Co., 1231 St. Valier St., Quebec, Que.

Exploration Syndicate of Ontario, Limited, Wilbur, Ont.

The Lake Superior Power Company, Sault Ste. Marie, Ont.

Atikokan Iron Company, Port Arthur, Ont.

Moose Mountain, Limited, Sellwood, Ont.  
 Dominion Bessemer Ore Company, Limited, 472 Bullitt Bldg., Philadelphia,  
 Pa.

#### IMPORTS AND EXPORTS.

The Customs Department does not keep a separate record of the imports of iron ore into Canada, but as the imports are practically all used in blast furnaces the statistics of consumption of imported ores in these furnaces will serve the same purpose.

There were used in Canadian iron furnaces during 1910, 1,377,035 tons of imported iron ores, as compared with 1,235,000 tons in 1909. Increasing amounts of iron ores have been imported since 1896, the total quantity imported during the fifteen years being 8,898,121 tons.

According to United States reports of Commerce and Navigation there were exported to Canada during the twelve months ending June 30, 1910, 609,617 tons (2,000 pounds) of iron ore valued at \$1,636,917, and during the previous year 449,755 tons (2,000 pounds), valued at \$1,264,048.

The shipments from Newfoundland to Canada, during the calendar year 1910, were 808,762 tons, as compared with 697,068 tons during the year 1909.

There were exported during 1910 about 114,499 tons of iron ore, valued at \$324,186, as compared with exports of 21,956 tons, valued at \$61,954, in 1909.

The ores exported in 1910 were chiefly those from Torbrook, N.S., Bathurst, N.B., Moose mountain, Ont., and titaniferous iron sands from Quebec.

Annual statistics of exports are shown in the following tables:—

IRON.—TABLE 5.

#### Exports of Iron Ore, Calendar Years, 1893-1910.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1893.....	2,419	7,590	1902*.....	428,901	1,065,019
1894.....		21,294	1903*.....	368,233	922,571
1895.....	1,571	3,909	1904*.....	168,828	401,738
1896.....	1,033	1,911	1905*.....	168,289	407,881
1897.....	403	811	1906.....	74,778	149,177
1898.....	182	278	1907.....	25,901	45,907
1899.....	4,145	9,538	1908.....	(a)	
1900.....	5,527	13,511	1909.....	21,956	61,954
1901*.....	306,199	762,283	1910.....	114,499	324,186

\*The export figures for the five years indicated are incorrect owing to a duplication of entries.

(a) The figures of the Trade Report for this year include ferro-products, and are, therefore, omitted.

## IRON.—TABLE 6.

## Exports of Iron Ore, Fiscal Years, 1879-1910.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		\$			\$
1879.....	3,562	7,530	1895.....	2,315	5,743
1880.....	30,524	76,474	1896.....	14	35
1881.....	44,677	114,850	1897.....	1,320	2,492
1882.....	43,835	135,463	1898.....	360	402
1883.....	44,914	138,775	1899.....	1,849	4,968
1884.....	25,308	66,549	1900.....	4,327	7,689
1885.....	54,367	132,074	1901*.....	58,401	150,657
1886.....	7,542	25,039	1902*.....	525,983	1,303,901
1887.....	23,345	71,934	1903*.....	293,510	733,230
1888.....	13,544	39,945	1904*.....	233,850	579,883
1889.....	24,752	60,289	1905*.....	224,908	540,909
1890.....	13,811	31,376	1906*.....	148,040	345,540
1891.....	14,648	32,582	1907.....	34,191	65,367
1892.....	7,707	36,935	1908.....	26,310	46,686
1893.....	7,811	26,114	1909.....	3,933	71,663
1894.....	1,859	9,026	1910.....	31,535	80,540

\*See foot-note to Table 5. †Nine months ending March 31, 1907.

## IRON.—TABLE 7.

## Imports of Iron Ore into the United States from Canada, 1893-1910.\*

Year ending June 30.	Short. Tons.	Value.	Year ending June 30.	Short Tons.	Value.
		\$			\$
1893.....	7,706	17,186	1902.....	309,527	685,540
1894.....	301	756	1903.....	144,725	320,263
1895.....	2,681	10,114	1904.....	126,995	283,765
1896.....	39	142	1905.....	120,241	245,623
1897.....	2,535	5,243	1906.....	113,809	220,112
1898.....	1,313	2,904	1907.....	34,731	52,765
1899.....	2,585	5,120	1908.....	32,124	55,617
1900.....	4,477	5,550	1909.....	3,490	12,660
1901.....	34,453	76,159	1910.....	35,070	97,984

\*Compiled from the 'Foreign Commerce and Navigation of the United States.'

## PIG IRON AND STEEL.

An increase of 5.58 per cent is shown in the production of pig iron in Canada in 1910 over the production of 1909, as compared with an increase of 20 per cent in 1909 over that of 1908.

At the close of the year Canada had seventeen completed furnaces and two under construction, grouped in ten separate plants and operated by eight separate companies or corporations.

The total production in 1910 was 800,797 short tons (714,998 long tons), valued at approximately \$11,245,622; as compared with 757,162 short tons (676,038

long tons), valued at \$9,581,864, in 1909, and 630,835 short tons (563,246 long tons), valued at \$8,111,194, in 1908. The Londonderry furnace was not in operation during either of the past two years. These figures do not include the output from electric furnaces making ferro-products which are situated at Welland and Sault Ste. Marie, Ont., and Buckingham, Que. Ferro-silicon was made at Welland during 1910, but the Sault Ste. Marie and Buckingham plants were not in operation during the year.

Of the total output of pig iron in 1910, 17,164 tons, valued at \$333,956 or \$19.78 per short ton, were made with charcoal as fuel, and 783,633 tons, valued at \$10,911,674 or \$13.92 per ton, with coke. The amount of charcoal iron made in 1909 was 17,003 tons, and in 1908, 6,709 tons; while the quantity made with coke in 1909 was 740,159 tons and in 1908, 624,126 tons.

The classification of the production in 1910 according to the purpose for which it was intended was as follows:—

Bessemer 219,492 tons, basic 425,400 tons, foundry (including miscellaneous) 138,741 tons.

The classification of the production in 1909 was:—

Bessemer 221,931 tons, basic 400,921 tons, foundry (including miscellaneous) 116,307 tons.

The American Iron and Steel Association reported the production of Bessemer pig iron in 1908 as 126,348 short tons, as against 173,499 tons in 1907; and the production of basic pig iron in 1908 as 375,659 short tons, as against 382,208 tons in 1907.

The total production of pig iron in 1910 and 1909 is shown by provinces in the following table, the average value per ton being also indicated. In the case of Nova Scotia a large proportion of the pig iron is directly converted to steel, and as a very small portion of the metal is sold as pig iron it is somewhat difficult to place a satisfactory valuation upon the output. For statistical purposes a value of \$12 per short ton has been placed upon this production in 1910. The Quebec production is entirely charcoal iron, which has for many years commanded a high price.

IRON.—TABLE 8.

Production of Pig Iron by Provinces, 1909-10.

Provinces.	1909.			1910.			Percentage increase or decrease in quantity.
	Tons.	Value.	Value per Ton.	Tons.	Value.	Value per Ton.	
		\$	\$		\$	\$	%
Nova Scotia .....	345,380	3,453,800	10 00	350,287	4,203,444	12 00	+ 1.4
Quebec.....	4,770	125,623	26 34	3,237	85,255	26 34	-32.1
Ontario.....	407,012	6,002,441	14 75	447,273	6,956,923	15 55	+ 9.9
Total.....	757,162	9,581,864	12 65	800,797	11,245,622	14 04	+ 5.8



A record of the production by provinces since 1887 is shown in Table 9. It will be observed that while the production in Nova Scotia has remained fairly constant during the past five years, the Ontario production has increased from 275,558 tons in 1906 to 447,273 tons in 1910. The proportions of the whole contributed by the several provinces were in 1910: Nova Scotia, 43.7 per cent; Ontario, 55.8 per cent, and Quebec, less than half of one per cent.

IRON.—TABLE 9.

## Annual Production of Pig Iron by Provinces, 1887-1910.

Year.	NOVA SCOTIA.		ONTARIO.		QUEBEC.		TOTAL.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$		\$
1887.....	19,320	250,000			5,507	116,192	24,827	366,192
1888.....	17,556	211,403			4,243	101,832	21,799	313,235
1889.....	21,289	383,202			4,632	116,670	25,921	499,872
1890.....	18,382	262,608			3,390	69,080	21,772	331,688
1891.....	21,353	309,527			2,538	59,374	23,891	337,901
1892.....	40,049	583,556			2,394	53,865	42,443	673,421
1893.....	46,472	553,408			9,475	236,875	55,947	700,283
1894.....	41,344	449,533			8,623	196,914	49,967	646,447
1895.....	35,192	417,083			7,262	169,653	42,454	586,736
1896.....	32,351	400,829	28,302	368,942	6,615	154,358	67,268	924,129
1897.....	22,500	230,000	26,115	291,466	9,392	217,235	58,007	738,701
1898.....	21,627	221,677	48,253	530,789	7,135	159,929	77,015	912,395
1899.....	31,100	404,300	64,749	808,157	7,094	164,849	102,943	1,377,306
1900.....	28,133	421,995	62,387	938,725	6,055	140,978	96,575	1,501,698
1901.....	151,130	1,764,017	116,371	1,599,413	6,875	149,493	274,376	3,512,923
1902.....	237,244	2,477,767	112,688	1,584,273	7,970	181,501	357,902	4,243,541
1903.....	201,246	2,186,273	87,004	1,345,464	9,635	210,973	297,885	3,742,710
1904.....	164,488	1,700,130	127,845	1,746,126	11,121	241,729	303,454	3,687,985
1905.....	261,014	2,440,722	256,704	3,868,197	7,588	166,267	525,306	6,475,186
1906.....	315,008	3,439,217	275,558	4,338,275	7,845	177,644	598,411	7,955,136
1907.....	366,456	4,211,913	275,459	4,581,309	10,047	232,004	651,962	9,125,226
1908.....	352,642	3,554,540	271,484	4,385,271	6,709	171,383	630,835	8,111,194
1909.....	345,380	3,453,800	407,012	6,002,441	4,770	125,623	757,162	9,581,864
1910.....	350,287	4,203,444	447,273	6,956,923	3,237	85,255	800,797	11,245,622

*Pig Iron Prices.*—With respect to prices of pig iron in Canada during 1910, we are indebted to a prominent firm of iron merchants in Montreal for the following information. It is practically impossible to give information respecting iron prices in detailed form since much depends on the quantity purchased, brand of iron, prevailing freight rate, etc.; nevertheless it may be said that good average brands of Scotch iron sold in Montreal during the first three months of 1910 at about \$20 per gross ton. Later in the year, particularly after the opening of navigation, prices eased up somewhat and an average price would be \$19.50 per gross ton. On the other hand good foundry iron of English manufacture could have been purchased during the early part of 1910 at \$18 per gross ton, then shading down to \$17.25 per gross ton during the summer months. There was little competition from Canadian made iron in the Montreal district during 1910 the Sydney furnaces not marketing anything there during that period.



In Toronto the situation was somewhat different. It costs approximately \$2 per ton more to lay down Scotch and English iron at that point than it does in Montreal, and during the early part of the year such advance in price was obtained. Later in the year, however, the American situation seriously affected prices in Ontario, and United States pig iron competed very keenly in the Toronto-Hamilton district, practically cutting out Scotch and English iron and compelling the local furnaces to reduce their prices to an equivalent of \$18.50 and down to \$18, f.o.b. cars Toronto, for good average grades of foundry iron.

In Pittsburgh, Bessemer iron was quoted at \$19 per gross ton in January, 1910, falling to \$17.50 in March, \$17 in May, \$15.75 in June, and \$15 from the latter part of August to the close of the year. Basic iron ruled from \$1.75 to \$2 per ton less.

The quantities of iron ore, coke, charcoal, limestone, etc., consumed in blast furnaces in 1909 and 1910, are shown as follows:—

IRON.—TABLE 10.

## Ore, Fuel, and Flux Charged to Blast Furnaces, in Years 1909-10.

	1909.			1910.		
	Quantity.	Value.	Canadian and Imported.	Quantity.	Value.	Canadian and Imported.
		\$	%		\$	%
Canadian iron ore and mill cinder..... Tons.	257,502	892,947	17	171,191	564,838	11
Imported iron ore..... "	1,235,000	2,989,512	83	1,377,035	3,668,409	89
Canadian coke..... "	412,016	1,339,032	45	491,281	1,596,664	51
*Imported coke..... "	507,255	2,214,578	55	476,838	2,263,917	49
Charcoal..... Bus.	1,779,258	170,050		1,615,919	159,662	
Canadian limestone..... Tons.	428,140	328,091	81	464,584	360,756	82
Imported limestone..... "	97,936	83,091	19	104,771	85,636	18

\*Including coke made from imported coal.

Previous to 1896 pig iron was made entirely from Canadian ore. Since that date, however, increasing quantities of imported ore have been used as well as imported fuels and fluxes, and in 1910 about 89 per cent of the ore charged, 49 per cent of the coke, and 18 per cent of the limestone, were imported. This condition is due largely to questions of cost and transportation affecting each furnace. The Newfoundland iron ores can be cheaply and conveniently laid down in Sydney, N.S.; in fact the iron industry here has been built up on the basis of these ores and of the local coal supplies. In Ontario, also, large quantities of imported ores are used. In 1910 the imported ores used in Ontario amounted to 681,918 tons and the Canadian ores 143,283 tons, the imported ores being derived from Michigan and Minnesota deposits: thus during 1910 about 83 per cent of the ore used in this Province was imported, as compared with 71 per cent in 1909

and about 67 per cent in 1908. The fuel used in Ontario was also almost altogether imported as well as a portion of the limestone flux.

According to returns made to the Department of Trade and Commerce in connexion with claims for bounty, 84,759 tons only of the total pig iron production in Canada in 1910 were credited to Canadian ore and 659,891 tons to imported ore and bounty paid upon it as such. In 1909 bounty was paid upon 126,298 tons of pig iron from Canadian ore, and 607,718 tons from imported ore. No bounty is paid on the iron credited to the mill cinder, scale, etc., charged, so that the above figures do not represent the total output of the furnaces. Statistics of the quantities of ores, fuel, and flux charged to Canadian blast furnaces since 1887, are shown in the following table.

IRON.—TABLE 11.

## Iron Ore, Fuel, and Flux Charged to Furnaces since 1887.

Calendar Year.	IRON ORE CHARGED.		FUEL CHARGED.			Lime-stone.
	Canadian.	Imported.	Charcoal.	*Coke from Canadian Coal.	Imported Coke.	
	Tons.	Tons.	Bus.	Tons.	Tons.	Tons.
1887.....	60,434		940,400	33,581		17,171
1888.....	54,956		804,286	30,228		16,857
1889.....	65,670		755,800	36,333		22,122
1890.....	57,304		589,860	34,073		18,478
1891.....	60,933		441,812	32,796		11,377
1892.....	96,948		1,121,365	52,622		22,967
1893.....	124,053		1,302,720	65,332		27,797
1894.....	108,871		1,173,970	60,026		35,101
1895.....	93,208		789,561	51,629		31,585
1896.....	96,560	46,300	756,600	50,067	33,990	37,462
1897.....	53,658	55,722	1,031,800	35,800	27,810	31,273
1898.....	57,881	77,107	836,400	31,952	50,407	33,913
1899.....	66,384	120,650	1,928,025	44,844	64,648	51,826
1900.....	71,341	112,042	1,799,737	45,021	59,345	52,966
1901.....	156,613	361,010	1,835,736	207,835	115,367	169,399
1902.....	125,664	559,381	2,146,623	362,208	112,314	293,594
1903.....	82,035	485,911	2,322,030	350,190	96,540	277,452
1904.....	180,932	454,671	3,477,470	257,182	130,210	211,278
1905.....	116,974	861,847	4,404,394	365,897	243,882	369,715
1906.....	221,733	982,740	2,168,476	462,672	304,676	456,036
1907.....	244,104	1,117,260	1,682,085	521,068	327,082	488,462
1908.....	209,266	1,051,445	1,121,990	492,076	325,670	483,065
1909.....	257,502	1,235,000	1,779,258	412,016	507,255	526,076
1910.....	171,191	1,377,035	1,615,919	491,281	476,838	569,355

\*Includes for the first ten years small quantity of coal.

Of seventeen completed furnaces, six were in blast in 1910, for varying periods of time. The operating companies, with numbers and capacities of furnaces, were as follows:—

Dominion Iron & Steel Company, Sydney, C.B., one of the constituent companies of the Dominion Steel Corporation, Ltd.: four completed furnaces of 280 tons capacity each per day, operated throughout 1910, two for 365, one for 112

days, and the fourth for 255 days. A fifth furnace has been completed and will go into blast early in 1911, while the erection of a sixth furnace has been arranged for, the completion of which will give this Company a capacity of over 400,000 tons per annum.

Nova Scotia Steel and Coal Company, Limited, New Glasgow, N.S.: one furnace at Sydney Mines, C.B., of 200 tons capacity, operated 311 days. Furnace was blown out on May 1, when, according to the report of the General Manager, a new crucible jacket of  $2\frac{1}{2}$ " plate, steel reinforced with cast-iron, water-cooled slabs  $4\frac{1}{2}$ " thick, dovetailed into each other, new bosh jacket and mantel were installed; the furnace lined throughout, hot blast stoves, down-comers, gas-mains, boilers, blowing engines, and pumps were all overhauled and renewed where necessary. The furnace again went into blast June 24, and from this date to December 31, made an average daily output of 243 tons. For the same period, previous to relining, the average daily output was 160 tons.

Londonderry Iron & Mining Company, Limited, Londonderry, N.S.: one furnace of 100 tons capacity; idle throughout the year.

Canada Iron Corporation, Limited, Montreal, Que.: two small furnaces of seven and eight tons capacity, at Drummondville, Que., operated 272 days; one furnace of 25 tons daily capacity, at Radnor Forges, Que., operated 41 days during 1910; two furnaces of 125 tons and 250 tons at Midland, Ont., operated for 7 months and 4 months respectively.

Standard Chemical Company of Toronto, Deseronto, Ont.: one furnace with a daily capacity of 50 tons, operated for 253 days, during 1910.

Hamilton Steel & Iron Company (now the Steel Company of Canada, Ltd.), Hamilton, Ont.: two furnaces, one of 200 tons capacity, operated throughout 1910, a second furnace of 300 tons capacity, operated 329 days in 1910.

Algoma Steel Company, Limited, Sault Ste. Marie, Ont., a constituent Company of the Lake Superior Corporation: two furnaces at Steelton, near Sault Ste. Marie, of 250 tons capacity each, operated throughout the year. This Company also has under construction a 400 ton furnace, a 12" and 18" merchant mill, and a complete installation of by-product coking ovens (110 ovens, Koppers type, with capacity of 1,100 tons of coke per day).

The Atikokan Iron Company, Limited, Port Arthur, Ont.: one furnace of 100 tons capacity, operated for 8 months during 1910.

The total daily capacity of the seventeen completed furnaces is about 2,985 tons. The two furnaces approaching completion at the close of the year will increase this capacity to about 3,650 tons per day.

The average number of men employed in the blast furnace operations in 1910 is reported as 1,403 and the total wages paid \$1,006,727. Of the seventeen completed furnaces eleven were in blast and six idle on December 31, 1910.

#### IMPORTS AND EXPORTS OF PIG IRON.

There has been comparatively little pig iron exported from Canada. During 1910, the exports were 9,763 tons valued at \$296,310, or an average value per ton of \$30.35. The exports during 1909 were 5,063 tons valued at \$186,778, an



average of \$36.89; while during 1908 the exports were 290 tons valued at \$10,614, an average of \$42.45 per ton. These exports probably include ferro-silicon as well as ordinary pig iron.

Considerable quantities of pig iron are annually imported into Canada. During the calendar year 1910, the imports of ordinary pig iron were 227,753 tons valued at \$3,122,695, an average of \$13.71 per ton, and of charcoal pig iron 16,106 tons, valued at \$242,152, an average of \$15.03 per ton; or a total importation of 243,859 tons valued at \$3,364,847. During the calendar year 1909 the imports were: ordinary pig iron, 147,925 tons valued at \$1,798,172, and charcoal pig iron, 413 tons valued at \$5,727; and during the calendar year 1908, the imports were: ordinary pig iron 57,343 tons valued at \$771,715, and charcoal iron 1,022 tons, valued at \$18,818. The annual imports of these two classes of pig iron since 1880 are shown in the accompanying table, No. 12, the statistics being given therein for the fiscal year. The duty, or general tariff, on pig iron is \$2.50 per ton.

IRON.—TABLE 12.

## Annual Imports of Pig Iron Since 1880.

Fiscal Year.	PIG IRON.		CHARCOAL PIG IRON.		TOTAL.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
1880, year ending June 30.....	(a) 23, 159	371, 956			23, 159	371, 956
1881 " " .....	(a) 43, 630	715, 997			43, 630	715, 997
1882 " " .....	56, 594	811, 221	6, 837	211, 791	63, 431	1, 023, 012
1883 " " .....	75, 295	1, 085, 755	2, 198	58, 994	77, 493	1, 144, 749
1884 " " .....	49, 291	653, 708	2, 893	66, 602	52, 184	723, 010
1885 " " .....	42, 279	545, 426	1, 119	27, 333	43, 398	572, 759
1886 " " .....	42, 463	528, 483	3, 185	60, 086	45, 648	588, 569
1887 " " .....	46, 295	554, 388	3, 919	77, 420	50, 214	631, 808
1888 " " .....	(b) 48, 973	648, 012			48, 973	648, 012
1889 " " .....	(b) 72, 115	864, 752			72, 115	864, 752
1890 " " .....	(b) 87, 613	1, 148, 078			87, 613	1, 148, 078
1891 " " .....	(b) 81, 317	1, 085, 929			81, 317	1, 085, 929
1892 " " .....	(b) 68, 918	886, 485			68, 918	886, 485
1893 " " .....	56, 849	682, 209	5, 444	84, 358	62, 793	766, 567
1894 " " .....	42, 376	483, 787	2, 906	34, 968	45, 282	518, 755
1895 " " .....	31, 637	341, 259	2, 780	31, 171	34, 417	372, 430
1896 " " .....	36, 131	394, 591	917	11, 726	37, 048	406, 317
1897 " " .....	25, 766	291, 788	2, 936	35, 373	28, 702	327, 161
1898 " " .....	37, 186	382, 103	2, 250	23, 533	39, 436	405, 636
1899 " " .....	44, 261	452, 911	1, 955	19, 123	46, 216	472, 034
1900 " " .....	49, 767	811, 490	1, 816	38, 736	51, 583	850, 226
1901 " " .....	35, 293	548, 033	490	7, 121	35, 783	555, 154
1902 " " .....	39, 978	585, 077	38	726	40, 016	585, 803
1903 " " .....	91, 730	1, 338, 574	882	16, 352	92, 612	1, 354, 926
1904 " " .....	62, 515	894, 728			62, 515	894, 728
1905 " " .....	71, 005	857, 879			71, 005	857, 879
1906 " " .....	96, 797	1, 401, 047			96, 797	1, 401, 047
1907, nine months ending March 31.....	150, 127	2, 280, 860	30	675	150, 157	2, 281, 535
1908, year ending March 31.....	210, 053	3, 448, 125	2, 237	45, 475	212, 290	3, 493, 600
1909 " " .....	57, 669	857, 357	922	16, 575	58, 591	873, 932
1910 " " .....	158, 910	2, 118, 445	596	8, 690	159, 506	2, 127, 135

(a) Comprises pig iron of all kinds.

(b) These figures appear in Customs reports under heading 'iron in pigs, iron kentledge, and cast-iron.'

IRON.—TABLE 13.

## Annual Exports of Pig Iron, 1896-1910.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1896.....	2,187	55,448	1903.....	4,400	78,382
1897.....	3,099	81,381	1904.....	21,016	200,363
1898.....	1,278	32,645	1905.....		866
1899.....	6,981	149,190	1906.....	305	7,429
1900.....	3,513	88,052	1907.....	439	13,504
1901.....	57,650	593,739	1908.....	290	10,614
1902.....	75,195	778,619	1909.....	5,063	186,778
			1910.....	9,763	296,310

*World's Production.*—The production of pig iron in other countries is given hereunder for the past five years, in order to show the relative position occupied by Canada in the production of this metal.

IRON.—TABLE 14.

## Production of Pig Iron in Principal Countries of the World, from 1906 to 1910: metric tons.

—	1906.	1907.	1908.	1909.	1910.
United States.....	25,713,556	26,195,340	16,191,907	26,209,677	27,741,990
Germany.....	12,292,819	12,875,159	11,805,321	12,644,946	14,227,455
United Kingdom.....	10,347,385	10,276,689	9,202,280	9,685,045	10,380,799
France.....	3,314,162	3,590,235	3,400,771	3,573,848	4,032,459
Russia.....	2,691,606	2,823,309	2,805,384	2,874,822	3,042,302
Austria-Hungary.....	1,687,581	1,872,684	2,041,523	2,044,573	**
Belgium.....	1,375,775	1,406,980	1,270,050	1,616,370	1,803,500
Canada.....	542,875	591,456	572,290	636,893	726,478
Sweden.....	604,789	615,778	567,821	444,764	604,300
Spain.....	379,241	355,240	403,554	389,000	**
Italy.....	135,296	112,232	112,924	207,800	**
China.....	*34,305	*36,306	66,409	74,000	**
Japan.....	42,679	51,943	45,396	**	**
Australasia.....		29,902	30,393	29,762	42,268

\* Exports.

\*\* Not available.

## FERRO-PRODUCTS.

Ferro-silicon, ferro-chrome, ferro-phosphorus, etc., have been made in electric furnaces at Buckingham, Que., by the Electric Reduction Company, Limited; the furnaces, however, were not in operation during 1910. Ferro-silicon has also been made in electric furnaces at Sault Ste. Marie, and at Welland, Ont. The electric furnaces operated by the Electric Metals Company were in operation during 1910. These furnaces, constructed some three years ago, consist of four furnaces of from 1,000 to 1,500 horse-power each, the daily production being from 5 to 8 tons.



The imports of ferro-silicon, manganese, etc., during the calendar year 1910, were 18,900 tons valued at \$464,741, or an average of \$24.59 per ton. The imports during the calendar year 1910 were 17,699 tons valued at \$411,536, an average of \$23.25 per ton. The imports since 1887 are shown in Table 15, the figures of the table being for the fiscal year.

IRON.—TABLE 15.

## Imports of Ferro-Manganese, Etc., 1887-1910.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		\$			\$
*1887.....	123	1,435	†1899.....	1,160	22,539
*1888.....	1,883	29,812	†1900.....	1,149	39,064
*1889.....	5,868	72,108	†1901.....	1,512	38,954
*1890.....	696	18,895	†1902.....	6,513	150,977
*1891.....	2,707	40,711	†1903.....	6,350	162,710
*1892.....	1,311	23,930	†1904.....	2,975	75,554
*1893.....	529	15,858	†1905.....	12,935	246,815
*1894.....	284	9,885	†1906.....	15,023	462,739
†1895.....	164	5,408	†1907 (9 months).....	16,414	610,875
†1896.....	652	12,811	†1908.....	17,417	612,062
†1897.....	426	9,233	†1909.....	13,053	388,024
†1898.....	1,418	22,516	†1910.....	14,952	332,486

\* These amounts include: ferro-manganese, ferro-silicon, spiegel, steel bloom ends and crop ends of steel rails, for the manufacture of iron or steel.

† Ferro-silicon, spiegeleisen, and ferro-manganese.

## STEEL.

Returns of steel production received direct from the producers showed a total production of ingots and castings for 1910 of 822,284 tons, as compared with 754,719 tons in 1909, and 588,763 tons in 1908. In 1910 the production of open-hearth ingots was reported as 580,932 tons, Bessemer ingots 222,668 tons, direct open-hearth castings 18,085 tons, and other steels 599 tons; compared with 1909 there was an increase in total production of 67,565 tons, or nearly 9 per cent. The production during the past four years is shown in Table 16 following:—

IRON.—TABLE 16.

## Production of Steel, 1907, 1908, 1909, 1910.

	1907.	1908.	1909.	1910.
	Tons.	Tons.	Tons.	Tons.
Ingots—Open-hearth (basic).....	459,240	443,442	535,988	580,932
Bessemer (acid).....	225,989	135,557	203,715	222,668
Castings—Open-hearth.....	20,602	9,051	14,013	18,085
Other steels.....	1,151	713	1,003	599
Total.....	706,982	588,763	754,719	822,284

Statistics showing the quantities of the principal materials used in steel furnaces have been obtained for the first time for the year 1910, and it may be of interest to refer to these here. The total quantity of pig iron used in steel furnaces during 1910 was 690,913 tons: of which 601,219 tons were produced by firms reporting, and 89,694 tons purchased. The quantity of ferro-alloys used was 8,143 tons purchased. Scrap, etc., was used to the extent of 211,453 tons, being 140,913 tons produced by the firms reporting, and 70,540 tons purchased. Ores used included 1,317 tons of manganese ore and 39,332 tons of iron ore, while 144,110 tons of limestone or dolomite flux were used and 7,461 tons of fluorspar. In Ontario a little over 600 million cubic feet of natural gas were used, while in Nova Scotia, coke oven gas was used at Sydney, of which a record of quantity is not obtained.

Statistics of the production of steel ingots and castings since 1894 are given in the following table, the figures from 1894 to 1906 inclusive having been collected and published by the American Iron and Steel Association; those for the years 1907 to 1910 have been collected by this Department and are as shown in detail in Table 16.

IRON.—TABLE 17.

**Annual Production of Steel Ingots and Castings, 1894-1910.**

Calendar Year.	Short Tons.	Calendar Year.	Short Tons.	Calendar Year.	Short Tons.
1894.....	28,767	1900.....	26,406	1906.....	639,396
1895.....	19,040	1901.....	29,214	1907.....	706,982
1896.....	17,920	1902.....	203,881	1908.....	588,763
1897.....	20,608	1903.....	203,296	1909.....	754,719
1898.....	24,125	1904.....	166,381	1910.....	822,284
1899.....	24,640	1905.....	451,863		

Following is a list of firms making steel in Canada:—

- Dominion Iron and Steel Company, Sydney, N.S.
- Nova Scotia Steel and Coal Company, New Glasgow, N.S.
- Montreal Steel Works, Limited, Montreal, Que.
- The Algoma Steel Company, Sault Ste. Marie, Ont.
- The Hamilton Steel and Iron Company, Hamilton, Ont.
- The Wm. Kennedy Sons, Limited, Owen Sound, Ont.
- The Ottawa Steel Castings Company, Limited, Ottawa, Ont.
- The Ontario Iron and Steel Company, Limited, Welland, Ont.

*Rolled Products, etc.*—Complete statistics of the production of rolled products and of manufactured steel have not been received; returns from seven of the largest producers, however, show a production of blooms, billets, slabs, etc., of 628,100 tons, of which 580,533 tons were used by the producer for further manufacture, and 47,567 tons sold to other rolling mills.

The production of rails was 399,762 tons, of rods 88,456 tons, of bars 125,778 tons, of other rolled products 31,516 tons. The production of steel rails in 1909 was returned as 377,642 tons, and in 1908, 300,935 tons.

The production of finished rolled iron and steel in Canada from 1906 to 1910, as ascertained and published by the American Iron and Steel Association, was as follows, in long tons:—

IRON.—TABLE 18.

## Annual Production of Rolled Iron and Steel, 1906-10.

Products—Gross Tons.	1906.	1907.	1908.	1909.	1910.
Rails.....	312,877	311,461	268,692	344,830	366,465
Structural shapes and wire rods.....	48,351	65,541	41,520	74,136	80,993
Plates and sheets.....	15,202	18,493	11,656	36,241	26,642
Nail plate, merchant bars, and all other finished rolled forms.....	195,312	204,684	174,649	207,534	265,711
Totals.....	571,742	600,179	496,517	622,741	739,811

## BOUNTIES.

Bounties on iron and steel made in Canada were provided for by the Dominion government in 1897 (Chapter 6, Statutes of Canada, 1897). This Act was amended in 1899 (Chapter 8, Statutes of Canada, 1899), and again in 1903 (Chapter 68, Statutes of Canada, 1903). The latter Act provided for the payment of bounty until June 30, 1907. On April 27, 1907, a new Act was passed (Chapter 24, Statutes of Canada, 1907), providing for the further payment of bounties from January 1, 1907, to December 31, 1910, and in the case of pig iron made by electric smelting, until December 31, 1912. An Act assented to May 4, 1910 (Chapter 33, 1910, Edward VII), provided that the bounty on rolled round wire rods should cease after the 30th day of June, 1911. The two last mentioned Acts are as follows:—

*Chapter 24, Statutes of Canada, 1907.***An Act Respecting Bounties on Iron and Steel made in Canada.**

(Assented to, 27th April, 1907.)

His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. The Governor in Council may authorize the payment out of the Consolidated Revenue Fund of the following bounties on the undermentioned articles when manufactured in Canada for consumption therein, viz.:—

(a) In respect of pig iron manufactured from ore, on the proportion from Canadian ore produced during the calendar year:—

1907.. . . . .	\$2 10 per ton.
1908.. . . . .	2 10 "
1909.. . . . .	1 70 "
1910.. . . . .	0 90 "

(b) In respect of pig iron manufactured from ore, on the proportion from foreign ore produced during the calendar year:—

1907.. . . . .	\$1 10 per ton.
1908.. . . . .	1 10 "
1909.. . . . .	0 70 "
1910.. . . . .	0 40 "

(c) On puddled iron bars manufactured from pig iron made in Canada during the calendar year:—

1907.. . . . .	\$1 65 per ton.
1908.. . . . .	1 65 "
1909.. . . . .	1 05 "
1910.. . . . .	0 60 "

(d) In respect of rolled, round wire rods not over three-eighths of an inch diameter, manufactured in Canada from steel produced in Canada from ingredients of which not less than fifty per cent of the weight thereof consists of pig iron made in Canada, when sold to wire manufacturers for use, or when used in making wire in their own factories in Canada, on such wire rods made after the thirty-first day of December, one thousand nine hundred and six, six dollars per ton.

(e) In respect of steel manufactured from ingredients of which not less than fifty per cent of the weight thereof consists of pig iron made in Canada, on such steel made during the calendar year:—

1907.. . . . .	\$1 65 per ton.
1908.. . . . .	1 65 "
1909.. . . . .	1 05 "
1910.. . . . .	0 60 "

(2) No bounty shall be paid under the foregoing provisions in respect of iron or steel made in Canada by electric process after the thirty-first day of December, one thousand nine hundred and eight.

2. The Governor in Council may authorize the payment out of the Consolidated Revenue Fund of the following bounties on the undermentioned articles when manufactured in Canada for consumption therein, viz.:—

(a) On pig iron manufactured from Canadian ore by the process of electric smelting during the calendar year:—

1909.. . . . .	\$2 10 per ton.
1910.. . . . .	2 10 "
1911.. . . . .	1 70 "
1912.. . . . .	0 90 "



(b) On steel manufactured by electric process direct from Canadian ore, and on steel manufactured by electric process from pig iron smelted in Canada by electricity from Canadian ore during the calendar year:—

1909.	..\$1 65 per ton.
1910.	.. 1 65 “
1911.	.. 1 05 “
1912.	.. 0 60 “

(2) Bounty, as on pig iron under this section, may be paid upon the molten iron from the ore which in the electric furnace enters into the manufacture of steel by the direct process, the weight of such iron to be ascertained from the weight of the steel so manufactured.

3. No bounty shall be paid on steel ingots from which steel blooms and billets for exportation from Canada are manufactured.

4. The Governor in Council may make regulations to carry out the intention of this Act.

5. The Minister of Trade and Commerce shall be charged with the administration of this Act.

6. Chapter 8 of the Statutes of 1899, Chapter 68 of the Statutes of 1903, and Chapter 39 of the Statutes of 1904, are repealed.

7. This Act shall be deemed to have come into force on the first day of January, one thousand nine hundred and seven.

*Chapter 33, Statutes of Canada, 1910.*

**An Act respecting Bounties on Iron and Steel made in Canada.**

(Assented to 4th May, 1910).

His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. No bounties shall be payable in respect of rolled, round wire rods after the thirtieth day of June, one thousand nine hundred and eleven, under paragraph (d) of subsection 1 of section 1 of chapter 24 of the statutes of 1907, intituled “An Act respecting Bounties on Iron and Steel made in Canada.”

2. Nothing in section 1 of this Act shall prevent the payment, after the said thirtieth day of June, one thousand nine hundred and eleven, of the bounty otherwise payable under the said paragraph (d) in respect of rolled, round wire rods if such rods were, on or before the said thirtieth day of June, one thousand nine hundred and eleven, sold to wire manufacturers for use or used in making wire by the makers of such rods in their own factories in Canada.

3. For the purposes of this Act wire rods shall be deemed to be sold when such rods are delivered to the purchaser, or are delivered to a common carrier for transport to the purchaser.



The following statistics respecting bounty payments have been furnished by the Department of Trade and Commerce, or compiled from reports of the Auditor General.

The total bounty payments on account of iron and steel made during the calendar year 1910 were \$1,344,144.59, as compared with \$1,895,011.55 paid on account of iron and steel made during 1909, and \$1,998,283.58 paid for 1908.

Since 1896 a total of about \$17,500,000 has been paid by the government of Canada in bounties for the production of iron and steel. Further details with respect to the amounts of bounties paid will be found in the accompanying tables.

# Bounties Paid on Pig Iron, manufactured in Canada, during the Twelve Months ending December, 1909.

Name of Claimant.	Tons of Canadian ore used.	Tons of foreign ore used.	Tons of pig iron made from Canadian ore.	Bounty on pig iron from Canadian ore. \$ cts.	Tons of pig iron from foreign ore.	Bounty on pig iron from foreign ore. \$ cts.	Total tons of pig iron produced.	Amount of claim.
Dominion Iron and Steel Co., Ltd.	1,742.00	577,065.00	908.27	1,544.06	277,042.95	193,930.06	277,951.22	195,474.12
Hamilton Steel and Iron Co., Ltd.	121,121.14	181,131.15	68,001.34	115,602.30	88,916.55	62,241.59	136,917.89	177,843.89
Nova Scotia Steel and Coal Co., Ltd.	66,930.67	110,649.00	35,041.07	59,569.82	57,885.00	40,519.50	57,885.00	40,519.50
Algoma Steel Co., Ltd.	13,452.12	283,531.65	8,882.22	15,099.76	140,525.98	98,368.19	175,567.05	157,938.01
Atikokan Iron Co., Ltd.	60.90	.....	19.94	33.90	.....	.....	8,882.22	15,099.76
Canada Iron Corp., Ltd., (Drummondville).	17,280.83	58,421.12	9,207.27	15,652.37	30,602.43	21,421.73	39,809.70	37,074.10
" " (Midland)	9,884.84	1,487.81	3,939.56	6,697.22	810.42	567.28	4,749.98	7,264.50
" " (Rednor)	622.21	23,201.73	237.88	506.37	11,934.76	8,334.29	12,232.64	8,860.66
Standard Chemical Co. of Toronto, Deseronto.	231,094.71	1,235,487.46	126,297.55	214,705.80	607,718.09	425,402.64	734,015.64	640,108.44

## Bounties Paid on Steel Ingots during the Twelve Months ending December, 1909.

—	Tons of Canadian pig iron used.	Tons of foreign pig iron used.	Tons of other ingredients.	Tons of steel made.	Bounty paid. \$ cts.
Dominion Iron and Steel Co., Ltd.	279,651.44	.....	95,346.60	332,320.99	348,937.06
Hamilton Steel and Iron Co., Ltd.	43,722.56	.....	40,108.49	76,847.94	80,690.36
Nova Scotia Steel and Coal Co., Ltd.	52,006.42	.....	20,866.45	64,239.94	67,451.95
Algoma Steel Co., Ltd.	181,842.04	6,978.82	31,045.71	199,770.05	209,758.55
Lake Superior Iron and Steel Co., Ltd.	28,466.77	54.50	26,940.74	51,740.24	54,327.26
*Ontario Iron and Steel Co., Ltd.	3,222.17	.....	2,883.07	4,270.21	5,305.23
	588,911.40	7,033.32	217,291.06	729,189.37	766,470.41

\*Includes a small quantity produced in 1908.  
During the year bounty to the amount of \$488,432.70 was paid the Dominion Iron and Steel Co., Ltd., for 81,405.42 tons of wire rods made.

# Bounties Paid on Pig Iron, manufactured in Canada, during the Twelve Months ending December, 1910.

Name of Claimant.	Tons of Canadian ore used.	Tons of foreign ore used.	Tons of pig iron made from Canadian ore.	Bounty on pig iron from Canadian ore.	Tons of pig iron from foreign ore.	Bounty on pig iron from foreign ore.	Total tons of pig iron produced.	Amount of claim.
				\$ cts.		\$ cts.		\$ cts.
Dominion Iron and Steel Co., Ltd.	.....	569,949.00	.....	.....	280,937.93	112,375.17	280,937.93	112,375.17
Hamilton Steel and Iron Co., Ltd.	78,373.57	259,980.07	44,484.18	40,035.77	128,775.31	51,510.14	173,259.49	91,545.91
Nova Scotia Steel and Coal Co., Ltd.	.....	122,009.00	.....	.....	64,562.00	25,824.80	64,562.00	25,824.80
Algoma Steel Co., Ltd.	25,861.49	305,250.53	14,265.20	12,838.67	167,041.24	66,816.50	181,306.44	79,655.17
Atikokan Iron Co., Ltd.	24,951.13	.....	17,103.31	15,392.97	.....	94.00	17,338.30	17,486.97
Canada Iron Corp., Ltd., (Drummondville)	.....	321.72	2,266.12	2,039.51	163.52	65.41	2,429.64	2,104.92
" " (Midland)	5,897.90	75,308.16	6,281.87	5,653.72	39,800.63	15,920.27	46,082.50	21,573.99
" " (Radnor)	12,364.25	1,148.47	208.32	187.48	599.34	239.73	807.66	427.21
Standard Chemical Co. of Toronto, Deseronto	507.54	27,395.69	149.70	134.71	13,776.27	5,510.50	13,925.97	5,645.21
	288.39	.....	.....	.....	.....	.....	.....	.....
	148,244.27	1,361,787.51	84,758.70	76,282.83	695,891.23	278,356.52	780,649.93	354,639.35

## Bounties Paid on Steel Ingots during the Twelve Months ending December, 1910.

	Tons of Canadian pig iron used.	Tons of foreign pig iron used.	Tons of other ingredients.	Tons of steel made.	Bounty paid.
					\$ cts.
Dominion Iron and Steel Co., Ltd.	.....	.....	.....	339,450.03	203,670.04
Hamilton Steel and Iron Co., Ltd.	306,051.68	.....	87,101.19	90,353.28	54,211.95
Nova Scotia Steel and Coal Co., Ltd.	52,774.51	.....	47,299.78	72,927.72	43,756.63
Algoma Steel Co., Ltd.	58,043.10	.....	22,918.14	222,637.21	133,582.33
Lake Superior Iron and Steel Co., Ltd.	187,994.56	34,823.05	26,524.40	42,011.15	25,206.69
	23,631.80	722.50	20,928.26	.....	.....
	628,495.65	35,545.55	204,771.77	767,379.39	460,427.64

During the year bounty to the amount of \$529,077.60 was paid Dominion Iron and Steel Co., Ltd., for 88,179.58 tons of wire rods made.

### Total Bounty paid to each Company during the past three Fiscal years.

Corporations.	1908.	1909.	1910.
	\$ cts.	\$ cts.	\$ cts.
Algoma Steel Co., Ltd.....	534,025 50	304,789 25	318,814 17
Atikokan Iron Company, Ltd.....	17,210 46		15,099 76
*{Canada Iron Furnace Co., Ltd}.....	51,213 12	56,831 92	40,148 06
{John McDougall and Co. ....}	5,368 12		
†Deseronto Iron Co., Ltd.....	7,299 30		10,120 46
Dominion Iron and Steel Co., Ltd.....	1,228,915 39	1,067,528 92	1,029,503 85
Hamilton Steel and Iron Co., Ltd.....	222,490 31	252,311 20	238,408 35
Londonderry Iron and Mining Co., Ltd.....	37,441 52		
Lake Superior Iron and Steel Co., Ltd.....	17,500 60	45,890 58	54,628 56
Nova Scotia Steel and Coal Co., Ltd.....	181,436 26	130,374 99	97,345 79
Ontario Iron and Steel Co.....	251 77	6,887 30	4,463 73
	2,303,152 35	1,864,614 16	1,808,018 84

\* Amalgamated in 1909 to form Canada Iron Corporation, Ltd.

† In 1909 worked by the Standard Chemical Co. of Toronto.

### Total Bounties on Iron and Steel paid by the Government of Canada since 1896.

Year ended.	Pig Iron.	Puddled iron bars.	Steel.	Manufactures of Steel.
	\$	\$	\$	\$
June 30, 1896.....	104,105	5,611	59,499	
" 1897.....	66,509	3,019	17,366	
" 1898.....	165,654	7,706	67,454	
" 1899.....	187,954	17,511	74,644	
" 1900.....	238,296	10,121	64,360	
" 1901.....	351,259	16,703	100,058	
" 1902.....	693,108	20,550	77,431	
" 1903.....	666,001	6,702	729,102	
" 1904.....	533,982	11,669	347,990	15,321
" 1905.....	624,667	7,895	676,318	231,324
" 1906.....	687,632	5,875	941,000	369,832
March 31, 1907 (9 months).....	385,231	312	575,259	338,999
" 1908.....	363,817		1,092,201	347,135
" 1909.....	693,423		838,100	333,091
" 1910.....	573,969		695,752	538,812
Totals.....	6,835,607	113,674	6,356,534	2,174,514

### EXPORTS AND IMPORTS OF IRON AND STEEL GOODS.

Iron and steel goods were exported from Canada during 1910 to the total value of \$7,895,489; as compared with the value of exports in 1909 of \$7,172,413, and 1908, \$5,907,792. Of the total exports in 1910, stoves, castings, and machinery contributed a total valuation of \$1,141,027; pig iron, \$296,310; scrap iron and steel, \$171,603; steel and manufactures of steel, \$1,110,925; agricultural implements, \$4,712,597; and automobiles and bicycles, \$465,027. Details of these exportations during the past two years are shown in the accompanying table.



IRON.—TABLE 19.

Exports of Iron and Steel goods, the product of Canada, during the Calendar Years 1909 and 1910.

		1909.		1910.	
		Quantity.	Value.	Quantity.	Value.
			\$		\$
Stoves.....	No. 774		10,330	1,058	15,832
Castings, N.E.S.....	\$		25,038		51,958
Pig iron.....	Tons. 5,063		186,778	9,763	296,310
Machinery (linotype machines).....			43,686		39,438
Machinery, N.E.S.....			421,707		301,961
Sewing machines.....	No. 12,759		147,402	17,834	188,196
Typewriters.....	" 3,749		238,167	5,970	409,326
Scrap iron and steel.....	Cwt. 410,506		305,256	233,264	171,603
Hardware, tools, etc.....	\$		52,207		88,844
Hardware, N.E.S.....	"		35,507		43,472
Steel and manufactures of.....	"		1,132,678		1,110,925
Agricultural implements—					
Mowing machines.....	No. ....			18,745	634,326
Reapers.....	"			3,411	220,517
Harvesters.....	"			11,382	1,234,794
Ploughs.....	"			16,888	540,677
Harrows.....	"			8,924	115,068
Hay forks.....	"				
Hay rakes.....	"		4,226,280	6,344	205,342
Seeders.....	"			256	13,727
Threshing machines.....	"			29	8,576
All other.....	"				1,163,722
Parts of.....	"				575,848
Automobiles.....	" 213		279,924	387	433,663
Bicycles.....	" 84		2,703	72	2,710
Bicycles, parts of.....	"		64,750		28,654
Total.....			7,172,413		7,895,489

The detailed statement of the imports of iron and steel, as compiled from the annual reports of Trade and Navigation, is shown in Tables 21 and 22, Table 21 showing the imports subjects to duty and Table 22 showing the imports free of duty.

The total value of the imports during the fiscal year ending March, 1910, was \$59,952,197, as compared with the valuation of imports in 1909 of \$40,393,431, and \$61,819,698 during the fiscal year 1908. These imports include all classes of iron and steel goods manufactured, as well as those of a crude form. In many cases the imports of manufactured goods are given only in dollars, so that the total tonnage of imports cannot be estimated. In the case of most of the cruder materials, however, the quantities are given, and a compilation of these shows a minimum importation of iron and steel during the fiscal year ending March, 1910, of 915,425 tons, as compared with 565,734 tons in 1909 and 1,079,000 tons in 1908. A summary of these importations is shown in Table 20.

In addition to the imports of pig iron and of ferro-products which have already been referred to, this record shows an importation in 1910 of ingots,



blooms, billets, puddled bars, etc., of 36,819 tons; scrap iron and scrap steel, 28,797 tons; plates and sheets, 200,575 tons; bars, rods, hoops, bands, etc., 117,159 tons; structural iron and steel, 195,748 tons; rails and connexions, 55,183 tons; pipe and fittings, 16,705 tons; nails and spikes, 3,476 tons; wire, 68,211 tons; forgings, castings, and manufactures, 18,093 tons.

The total value of the 915,425 tons imported was \$27,874,437, or an average value per ton of \$30.44. Other iron and steel goods of which the weights are not recorded were imported to the value of \$32,077,760, making up the total value of \$59,952,197 shown in detail in Tables 21 and 22.

A very large proportion of these imports is derived from the United States, and it may be of interest here to quote from the records published in the "Commerce and Navigation of the United States" showing the exports of iron and steel goods from that country to Canada.

According to this authority there was exported to Canada from the United States during the twelve months ending June 30, 1910, 574,807 tons of iron and steel goods, valued at \$19,673,740, together with other iron and steel goods of which the weight is not given, valued at \$28,153,628, or a total value of \$47,827,368.

During the twelve months ending June 30, 1909, the corresponding exports to Canada were 332,802 tons valued at \$12,154,770, together with other iron and steel goods to the value of \$19,251,962, or a total value of \$31,406,732. Iron ores are not included in either case.

The detailed items will be found in Table 23.

IRON.—TABLE 20.

Imports of some Iron and Steel products of which the weights are available.

Material.	TWELVE MONTHS ENDING MARCH.		
	1908.	1909.	1910.
	Tons.	Tons.	Tons.
Pig iron.....	212,290	58,591	159,506
Ferro-products and chrome steel.....	17,661	13,206	15,153
Ingots, blooms, billets, puddled bars, etc.....	21,222	8,887	36,819
Scrap iron and scrap steel.....	69,213	26,212	28,797
Plates and sheets.....	126,172	116,610	200,575
Bars, rods, hoops, bands, etc.....	98,631	73,261	117,159
Structural iron and steel.....	373,871	162,735	195,748
Rails and connexions.....	52,706	32,543	55,183
Pipe and fittings.....	25,090	18,309	16,705
Nails and spikes.....	2,741	1,611	3,476
Wire.....	57,046	39,375	68,211
Forgings, castings, and manufactures.....	22,357	14,394	18,093
Total.....	1,079,000	565,734	915,425



Springs, N.O.P. and parts thereof, of iron or steel, for railway, tramway, or other vehicles.....	Cwt.	3, 105	16, 831	6, 100	36, 652
Axle and axle parts, N.O.P., and axle blanks and parts thereof, of iron or steel for railway, tramway, or other vehicles.....	"	39, 153	100, 731	40, 261	164, 891
Bar iron or steel, rolled, whether in coils, bundles, rods or bars, comprising rounds, ovals, squares, and flats, N.O.P.....	"	785, 981	1, 223, 995	1, 402, 674	1, 952, 170
Butts and hinges N.O.P.....	\$		38, 246		65, 783
Canada plates, tussia iron,terne plate, and rolled sheets of iron and steel coated with zinc, spelter or other metal, of all widths or thicknesses, N.O.P.....	Cwt.	74, 860	233, 753	59, 685	195, 126
Castings, iron or steel, N.O.P.....	\$		328, 368		403, 524
Cast iron pipe of every description.....	Cwt.	320, 275	370, 085	280, 891	327, 175
Chains, coil chains, chain links, and chain shackles of iron or steel of $\frac{1}{2}$ " diameter, and over.....	Tons	15, 190	202, 842	159, 578	153, 578
Chains, N.O.P.....	Cwt.	45, 386	131, 324	55, 216	158, 251
Tacks, shoe.....	\$		34, 221		45, 386
Nails, brads, spikes, and tacks of all kinds, N.O.P.....	Lbs.	23, 322	1, 929	23, 427	2, 519
Engines, etc.:—	"	335, 638	22, 678	483, 265	28, 753
Locomotives for railways.....	No.	113	384, 086	99	346, 090
Motor cars for railways and tramways.....	\$				41, 823
Engines, fire.....	"	2	3, 900	7	7, 141
Engines, gasoline.....	"	17	13, 411	12	7, 638
Engines, steam.....	"	4, 076	714, 574	5, 617	1, 000, 003
Boilers, N.O.P.....	"	380	234, 224	324	232, 864
Boilers, N.O.P.....	"	372	114, 975	654	243, 246
Fire extinguishing machines, including sprinklers for fire protection.....	"	287	39, 144	1, 988	120, 753
Fittings, iron or steel, for iron or steel pipe of every description.....	\$		78, 690		78, 248
Flat eye-bar blanks, not punched or drilled, for use exclusively in the manufacture of bridges or of steel structural work, or in car construction.....	Lbs.	4, 590, 270	232, 552	5, 321, 262	357, 782
Ferrosilicon, spiegeleisen, and ferro-manganese.....	Tons	3	80	199	5, 911
Forgings of iron and steel of whatever size, shape, or in whatever stage of manufacture, N.O.P., and steel shafting, turned, compressed or polished and hammered, drawn or cold rolled iron or steel bars or shapes, N.O.P.....	"	13, 053	388, 024	14, 952	332, 486
Hardware, viz.: builders, cabinet-makers, upholsterers, harness-makers, saddlers and carriage hardware, including curry-combs, N.O.P.....	Lbs.	2, 270, 838	96, 388	2, 491, 222	121, 952
Horse, mule, and ox shoes.....	\$		365, 230		503, 939
Iron or steel billets, weighing not less than 60 pounds per lineal yard.....	"		5, 880		13, 797
Iron or steel ingots, cogged ingots, blooms, slabs, puddled bars, and loops, or other forms, N.O.P., less finished than iron or steel bars, but more advanced than pig iron, except castings.....	Cwt.	78, 797	95, 350	567, 159	518, 102
Iron or steel bridges or parts thereof, iron or steel structural work, columns, shapes or sections, drilled, punched or in any further stage of manufacture than as rolled or cast, N.O.P.....	Cwt.	74, 305	53, 135	115, 490	97, 333
Iron in pig.....	Tons	69, 636	176, 613	48, 940	125, 938
Iron in pig charcoal.....	"	57, 669	857, 357	158, 910	2, 118, 440
Locks of all kinds.....	"	922	16, 575	596	8, 695
Machinery, etc.:—	\$		222, 000		353, 243
Automobiles and motor vehicles of all kinds.....	No.	533	585, 097	1, 424	1, 732, 215
Automobiles and motor vehicles, parts of.....	\$		127, 143		269, 586
Fanning mills.....	No.	1, 160	12, 813	831	10, 854
Grain crushers.....	"	12	263	49	661

## Imports of Iron and Steel Goods subject to Duty.

Material.	TWELVE MONTHS ENDING MARCH, 1909.		TWELVE MONTHS ENDING MARCH, 1910.	
	Quantity.	Value.	Quantity.	Value.
Machines, machinery, etc.:—		\$		\$
Windmills and complete parts thereof.	No.			
Ore crushers and rock crushers, stamp mills, cornish and belted rolls, rock drills, air compressors, cranes, derricks, and percussion coal cutters.		38,284	1,036	48,310
Portable machines:—		176,014		259,311
Fodder or feed cutters.	No.	1,740	180	1,713
Horse-powers for farm purposes.		958	48	3,912
Portable engines with boilers in combination and traction engines for farm purposes.		794,894	1,216	1,817,209
Portable sawmills and planing mills.		18,759	13	12,303
Steam shovels.		152,027	20	95,948
Threshing machine separators.		362,083	1,199	629,799
Threshing machine separators, parts of, including wind-stackers, baggers, weighers, and self-feeders for same, and finished parts thereof for repairs, when imported separately.		239,118		344,329
All other portable machines, N.O.P., and parts.		19,891		23,873
Sewing machines.	No.	207,295	16,430	323,249
Sewing machines, parts of.		52,044		101,584
Slot machines.	No.	7,832		
Machines, typewriting.		446,851	9,319	670,165
Machines, type-casting and type-setting, and parts thereof, adapted for use in printing offices.		123,446	66	297,071
Machines specially designed for ruling, folding, binding, embossing, creasing, or cutting paper or cardboard, when for use exclusively by printers, bookbinders, and by manufacturers of articles made from paper or cardboard, including parts thereof, composed wholly or in part of iron, steel, brass, or wood.				
Machines for carding, spinning, weaving, or knitting, imported by manufacturers for such purposes.		88,493	310	197,004
Lithographic presses and type-making accessories for same.		823,698		
Printing presses.		27,131		62,000
Machinery of a class or kind not made in Canada and parts thereof adapted for carding, spinning, weaving, braiding, or knitting fibrous material, when imported by manufacturers for such purposes.		160,600		326,185
All machinery composed wholly or in part of iron or steel, N.O.P., and iron or steel castings, and iron or steel integral parts of all machinery specified in tariff item 483.				847,247
Machines, washing.	No.	5,516,890		7,136,558
			6,538	36,178



Malleable iron castings and iron or steel casting, N. O. P.	Cwt.	7,797	34,001	.....	.....
Nails and spikes, composition and sheathing nails.	Lbs.	74,455	4,991	.....	9,140
Nails and spikes, cut (ordinary builders).	Cwt.	2,897	6,785	.....	255,728
Railway spikes.....	"	18,902	34,260	.....	2,461
Nails, wire of all kinds, N. O. P.	"	6,088	25,160	.....	29,842
Pumps, hand, N. O. P.	No.	11,951	54,216	.....	8,375
Iron and steel railway bars or rails of any form, punched or not, N. O. P., for railways, which term for the purposes of this item shall include all kinds of railways, street railways and tramways, even although they are used for private purposes only, and even although they are not used or intended to be used in connexion with the business of common carrying of goods or passengers.	Tons.	29,547	797,479	.....	17,861
Railway tie-plates.....	"	1,784	67,045	.....	50,108
Rolled iron or steel angles, tees, beams, channels, girders, and other rolled shapes or sections, not punched or drilled or further manufactured than rolled, N. O. P.	"	333	15,147	.....	2,526
Rolled iron or steel beams, channels, angles, and other rolled shapes of iron and steel, not punched, drilled, or further manufactured than rolled, weighing not less than 35 pounds per lineal yard, not being square, flat, oval or round shapes, and not being railway bars or rails.	Cwt.	383,529	553,702	.....	1,399
Rolled iron or steel hoop, band, scroll, or strip, 12 inches or less in width, No. 13 gauge and thicker, N. O. P.	"	1,050,541	1,444,741	.....	831,933
Rolled iron or steel hoop, band, scroll or strip, No. 14 gauge and thinner, galvanized or coated with other metal or not, N. O. P.	"	34,969	59,501	.....	2,011,445
Rolled iron or steel sheets or plates, sheared or unsheared, and skelp iron or steel, sheared or rolled grooves, N. O. P.	"	86,283	204,169	.....	25,319
Rolled iron or steel plates not less than 30" in width and not less than 1/4" in thickness, N. O. P.	"	156,910	242,690	.....	116,887
Rolled iron or steel sheets and strips, polished or not, No. 14 gauge and thinner, N. O. P.	"	333,447	453,205	.....	273,600
Rolls of chilled iron or steel.....	"	204,522	498,705	.....	634,688
Sad or smoothing hatters' and tailors' irons.....	"	1,547	5,056	.....	400,898
Safes, doors for safes and vaults.....	\$	.....	.....	.....	751
Screws, iron and steel, commonly called 'wood screws', N. O. P., including lag or coach screws, plated or not, and machine or other screws, N. O. P.	Gross	.....	92,491	.....	3,191
Scales, balances, weighing beams, and strength-testing machines of all kinds.....	\$	100,391	19,219	.....	5,556
Shafting, round, steel, in bars not exceeding 2 1/2" diameter.....	Cwt.	28,322	174,738	.....	140,274
Sheets or plates of steel, cold rolled with sheared edges over 14 gauge, and not less than 1 1/2" wide, for the manufacture of mower bars, hinges, typewriters, and sewing machines.....	"	.....	53,747	.....	29,189
Sheets, flat, of galvanized iron or steel.....	"	.....	.....	.....	119,447
Sheets, iron or steel, corrugated.....	"	128,002	388,885	.....	76,756
Sheets, iron or steel, corrugated, not galvanized.....	"	1,328	3,991	.....	6,161
Skates of all kinds, roller or other, and parts thereof.....	"	244	753	.....	266,687
Skelp iron or steel, sheared or rolled in grooves, imported by manufacturers of wrought iron or steel pipe, for use exclusively in the manufacture of wrought iron or steel pipe in their own factories.....	Pairs.	92,005	49,164	.....	3,991
Steel billets, N. O. P.	Cwt.	635,341	925,417	.....	1,546,580
Stoves of all kinds, for coal, wood, oil, spirits, or gas.....	"	24,638	31,869	.....	825,443
Stove urns of metal, and dovetails, chaplets, and hinge tubes of tin for use in the manufacture of stoves.....	\$	.....	355,786	.....	3,546
Switches, frogs, crossings, and intersections for railways.....	Cwt.	17,582	74,527	.....	48
Tubing—		.....	.....	.....	45,908
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, over 4" diameter, N. O. P.	\$	.....	245,238	.....	1,546,580
		.....	.....	.....	63,089
		.....	.....	.....	492,538
		.....	.....	.....	17,136
		.....	.....	.....	134,734
		.....	.....	.....	683,763



## Imports of Iron and Steel Goods subject to Duty.

Material.	TWELVE MONTHS ENDING MARCH, 1909.		TWELVE MONTHS ENDING MARCH, 1910.	
	Quantity.	Value. \$	Quantity.	Value. \$
<b>Tubing—Continued.</b>				
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, 4" and less in diameter, N. O. P.	Cwt.	212, 283		332, 215
Seamless steel tubing, valued at not less than $3\frac{1}{2}$ cents per lb.	"	24, 237	5, 039	27, 497
Roller or drawn square tubing of iron or steel, adapted for use in the manufacture of agricultural implements.	\$	4, 636		5, 942
Iron or steel pipe or tubing, plain or galvanized, riveted, corrugated or otherwise specially manufactured, including lockjoint pipe, N. O. P.	"	167, 803		194, 545
Iron or steel pipe, not butt or lap welded, and wire bound wooden pipe, not less than 30" internal diameter, when for use exclusively in alluvial gold mining.	"	16, 850		47, 488
Ware—Agate, granite, or enamelled iron or steel ware.	"	122, 418		143, 374
Ware—Iron or steel hollow ware, plain black or coated, N. O. P., and nickel and aluminium kitchen or household hollow ware.	"	20, 908		42, 507
Wire bale ties.	4, 541	5, 635		185
Wire bound wooden pipe, N. O. P.				
Wire cloth or woven wire and netting of iron or steel.				
Wire, crucible cast steel, valued at not less than 6 cents per lb.				
Wire screens, doors, and windows.				
Wire buckthorn strip fencing, woven wire fencing, and wire fencing of iron and steel, N. O. P., not to include woven wire or netting made from wire smaller than No. 14 gauge, not to include fencing or wire larger than No. 9 gauge.	1, 376, 974	74, 422	1, 347, 439	76, 792
Wire, single or several, covered with cotton, linen, silk, rubber, or other material, including cable so covered.	77, 410	14, 964	114, 770	24, 743
Wire of iron and steel all kinds, N. O. P.		5, 864		9, 623
Wire rope, stranded or twisted wire clothes lines, picture or other twisted wire, and wire cables, N. O. P.	1, 363, 438	45, 513	1, 598, 471	51, 688
Iron or steel nuts, rivets, or bolts with or without threads, nut bolt, and hinge blank, and T and strap hinges of all kinds, N. O. P.	1, 674, 448	277, 662	3, 157, 730	329, 229
Iron or steel scrap, wrought, being waste or refuse, including punchings, cuttings, and clippings of rails, the same not having been in actual use.	4, 723, 315	136, 628	7, 713, 386	210, 630
Penknives, jack-knives, and pocket knives of all kinds.	3, 146, 825	225, 675	5, 339, 334	345, 756
	23, 962	88, 248	33, 875	132, 082
	220, 444	140, 875	302, 714	191, 782
		102, 973		74, 868

Knives and forks of steel, plated or not, N. O. P.				167, 175	201, 445
All other cutlery, N. O. P.				357, 603	507, 612
Guns, rifles, including air guns and air rifles (not being toys), muskets, cannons, pistols, revolvers, or other firearms.					
Bayonets, swords, fencing foils, and masks.				446, 911	377, 960
Needles of any material or kind, N. O. P.				7, 080	6, 043
Steel, chrome steel.				69, 460	101, 496
Steel plate, universal mill or rolled edge plates of steel over 12" wide, imported by manufacturers of bridges or of structural work, or for use in car construction.		3, 057		13, 947	17, 581
Steel in bars or sheets to be used exclusively in the manufacture of shovels when imported by the manufacturers of shovels.		265, 356		370, 650	390, 953
Rolled iron or steel, or cast steel in bars, bands, hoops, scroll, or strip, sheet or plate of any size, thickness or width, galvanized or coated with any material or not, and steel blanks for the manufacture of milling cutters, when of greater value than 34 cents per pound.		17, 089		25, 022	36, 437
Steel balls adapted for use in bearings of machinery and vehicles.		41, 848		268, 662	415, 331
Flat steel, cold rolled, not over 3/4" thick, for the manufacture of cups and cones for ball bearings.				11, 474	14, 725
Steel wool.					1, 429
Tools and implements—		208		2, 025	2, 418
Adzes, cleavers, hatchets, wedges, sledges, hammers, crowbars, cant-dogs and track tools, picks, mattocks and eyes or poles for the same.					
Axes.				47, 575	63, 078
Saws.				26, 597	35, 667
Files and rasps, N. O. P.		4, 392		73, 058	80, 677
Tools, hand or machine, of all kinds, N. O. P.				76, 581	83, 927
Knife blades or blanks, and table forks of iron and steel, in the rough, not handled, filed, ground or otherwise manufactured.				682, 014	628, 471
Manufactures, articles or wares of iron and steel, or of which iron and steel (or either) are the component materials of chief value, N. O. P.					95
Totals				3, 324, 920	4, 994, 498
				33, 083, 397	49, 850, 258

IRON.—TABLE 22.

Imports of Iron and Steel Goods free of Duty.

Material.	TWELVE MONTHS ENDING MARCH, 1909.		TWELVE MONTHS ENDING MARCH, 1910.	
	Quantity.	Value. \$	Quantity.	Value. \$
Anchors for vessels.....				
Chain, malleable sprocket or link belting.....				
Cream separators, and steel bowls for.....				
Cream separators—materials which enter into the construction and form part of when imported by manufacturers of cream separators to be used in the manufacture thereof.....				
Gas buoys—The following articles and materials, when imported by manufacturers of automatic gas buoys and automatic gas beacons, for use in the manufacture of such buoys and beacons for the Government of Canada or for export, viz., iron or steel tubes over 16" in diameter; flanged and dished steel heads made from boiler plate, over 5 feet in diameter; hardened steel balls, not less than 3" in diameter; acetylene gas lanterns and parts thereof, and tobin bronze in bars or rods.....				
Iron or steel rods over $\frac{5}{8}$ " in diameter for manufacturing of chain.....				
Roller iron or steel rods not over $\frac{1}{2}$ " in diameter or width, to be manufactured into horseshoe nails.....				
Iron or steel, rolled round wire rods, in the coil, not over $\frac{3}{8}$ " in diameter, when imported by wire manufacturers for use in making wire in the coil in their own factories.....				
Boiler plate of iron or steel not less than 30" width, and not less than $\frac{1}{4}$ " thickness, for use exclusively in the manufacture of boilers.....				
Flat galvanized iron or steel sheets.....				
Roller iron and steel, and cast steel in bars, band, hoop, scroll or strip, sheet or plate of any size, thickness or width, galvanized or coated with any material or not, and steel blanks for the manufacture of milling cutters, when of greater value than 3½ cts. per lb.....				
Roller iron or steel sheets in strips, polished or not, 14 gauge and thinner, N.O.P.....				
Roller iron or steel, hoop, band, scroll, or strip, No. 14 gauge and thinner, galvanized or coated with other metal or not, N.O.P.....				
Iron tubing for manufacture of extension rods for windows.....				
Iron or steel, beams, sheets or plates, ankles, knees, nists or parts thereof, and cable chains for wooden, iron, steel or composite ships or vessels.....				
Locomotive and car wheel tires of steel in the rough.....				
Scrap iron and scrap steel, old, and fit only to be remanufactured, being part of or recovered from any vessel wrecked in waters subject to the jurisdiction of Canada.....				

### Machinery:—

Articles of metals as follows when for use exclusively in mining or metallurgical operations, viz: coal cutting machines, except percussion coal cutters; coal heading machines; coal augers; rotary cut drills; core drills; miners safety lamps and parts thereof; also accessories for cleaning, filling, and testing such lamps; electric or magnetic machines for separating or concentrating iron ores; furnaces for the smelting of copper, zinc, and nickel ores; converting apparatus for metallurgical processes in metals; copper plates, plated or not, machinery for extraction of precious metals by the chlorination or cyanide process; amalgamates; automatic creamers; automatic feeders; retorts; mercury pumps; pyrometers; bullion furnaces; amalgam cleaners; blast furnace blowing engines; wrought iron tubing, butt or lap welded; threaded, or coupled or not, over 4" in diameter; and integral parts of all machinery mentioned in this item; blowers of iron or steel for use in the smelting of ores, or in the reduction, separation, or refining of metals; rotary kilns, revolving roasters, and furnaces of metal designed for roasting ore; mineral rock or clay; furnace slag trucks, and slag pots of a class or kind not made in Canada; bidders, vanners, and slime tables adapted for use in gold mining.

Appliances of iron or steel, of a class or kind not made in Canada, and elevators and machinery of floating dredges, when for use exclusively in alluvial gold mining.

Well-drilling, and apparatus of a class or kind not made in Canada for drilling for water, natural gas or oil, and for prospecting for minerals, not to include motive power.

Briquette making machines.

Newspaper printing presses, of not less value by retail than \$1,500 each, of a class or kind not made in Canada.

Machinery and tools not manufactured in Canada up to the required standard necessary for any factory to be established in Canada for the manufacture of rifles for the Government of Canada.

All materials, or parts in the rough, unfinished, and screws, nuts, bands, and springs to be used in rifles to be manufactured at any such factory for the Government of Canada.

Machinery of every kind, and structural iron and steel for use in the construction and equipment of factories for the manufacture of sugar from beet root.

Machinery of a class or kind not made in Canada and parts thereof, for the manufacture of twine cordage, or linen, or for the preparation of flax fibre.

Mould boards or shares, or plough plates, land slides, and other plate for agricultural implements, when cut to shape from rolled plates of steel, but not moulded, punched, polished or otherwise manufactured.

Steel balls adapted for use on bearings on machinery, and vehicles.

Steel, rolled, for saws and straw cutters not tempered, or ground, nor further manufactured than cut to shape without indented edges.

Steel strips, and flat steel wire when imported into Canada by manufacturers of buckthorn and plain strip fencing, for use exclusively in their own factories in the manufacture thereof.

Steel wire, Bessemer soft drawn spring of Nos. 10, 12, and 13 gauge, respectively, and homo steel spring wire of Nos. 11 and 12 gauge, respectively, when imported by manufacturers of wire mattresses, to be used exclusively in their own factories in the manufacture of such articles.

Steel, crucible sheet, 11 to 16 gauge, 2½" to 18" wide, for the manufacture of mower and reaper knives when imported by manufacturers thereof for use exclusively in the manufacture of such articles in their own factories.

Steel No. 20 gauge and thinner, but not thinner than No. 30 gauge, for the manufacture of corset steels, clock springs, and shoe shanks, imported by manufacturers of such articles for exclusive use in the manufacture of such articles in their own factories.



## Imports of Iron and Steel Goods Free of Duty.

Material.	TWELVE MONTHS ENDING MARCH, 1909.		TWELVE MONTHS ENDING MARCH, 1910.	
	Quantity.	Value.	Quantity.	Value.
Steel wire, flat, of 16 gauge or thinner, imported by the manufacturers of crinoline, and corset wires and dress stays, for use exclusively in the manufacture of such articles in their own factories. .... Cwt.	4,094	26,495	12,950	46,665
Steel, No. 12 gauge and thinner, but not thinner than No. 30 gauge, for the manufacture of buckle clasps, bed fasts, furniture casters, and ice-creepers, imported by the manufacturers of such articles, for use exclusively in the manufacture of such articles in their own factories. ....	1,631	4,385	3,123	7,859
Steel, No. 24 and 17 gauge, in sheets 63" long and from 18" to 32" wide, when imported by the manufacturers of tubular bow sockets for use exclusively in the manufacture of such articles in their own factories. ....	906	774	1,565	3,090
Steel springs for the manufacture of surgical trusses, when imported by manufacturers of surgical trusses for use exclusively in the manufacture thereof in their own factories. .... Lbs.	18,520	39,002	2,265	479
Swedish rolled iron, and Swedish rolled steel nail rods, under half an inch in diameter, for the manufacture of horse shoe nails. ....	330	2,233	19,208	39,313
Steel seamless tubing valued at not less than 3½ cents per pound. ....	.....	.....	1,448	11,758
Steel rolled or drawn square tubing adapted for use in the manufacture of agricultural implements. .	.....	.....	.....	163
Steel or iron tubes, rolled, not joined or welded, not more than 1¼" diameter, N. O. P. ....	.....	7,181	.....	11,459
Seamless steel, or wrought iron boiler tubes, including flues and corrugated tubes for marine boilers	.....	415,068	.....	522,90
Steel imported by manufacturers of rifles for use in manufacturing rough parts of rifles, when such parts are to be used in rifles for the Government of Canada. ....	.....	.....	.....	4,180
Barbed fencing wire of iron or steel. ....	231,627	567,236	.....	765,427
Wire, crucible cast steel, valued at not less than 6 cents per pound. ....	10,588	1,830	351,576	1,450
Wire, curved or not, galvanized iron or steel, Nos. 9, 12, and 13 gauge. ....	399,506	858,129	763,538	1,524,742
Wire, steel, valued at not less than 2½ cents per pound when imported by manufacturers of rope for use exclusively in the manufacture of rope. ....	22,120	85,714	34,765	136,715
Totals. ....	.....	7,310,034	.....	10,101,939



## IRON.—TABLE 23.

## Imports of Iron and Steel into Canada from the United States.\*

MATERIAL.	TWELVE MONTHS ENDING JUNE 30, 1909.		TWELVE MONTHS ENDING JUNE 30, 1910.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Pig iron.....Short tons	34,918	510,813	75,270·7	1,135,509
Scrap and old, fit only for remanufacture ..	14,958·7	205,403	14,071·6	195,316
Bar iron.....	4,161	150,995	5,802·7	216,228
<i>Bars and Rods of Steel—</i>				
Wire rods.....	13,052·6	401,083	27,736	781,335
All other.....	37,473	1,326,158	75,050·9	2,390,235
Billets, ingots, and blooms of steel..	8,497	185,544	14,395	306,268
Hoop, band, and scroll.....	2,967	144,794	4,617·5	200,655
Steel rails for railways.....	29,049	745,835	30,525·6	801,084
Sheets and plates (iron).....	15,099	830,634	25,290	1,264,985
Sheets and plates (steel).....	66,219·5	2,965,179	128,277	4,875,466
Sheets and plates (tin plates, terne plates, and taggers tin).....	3,854	268,410	11,892·6	826,929
Structural iron and steel.....	41,148·8	1,585,137	74,574	2,828,338
Wire (barbd).....	10,233	493,773	18,202·5	839,818
Wire (all other).....	26,564	1,169,197	29,950	1,296,835
<i>Nails and spikes—</i>				
Cut.....	565	23,057	1,097·5	39,085
Wire.....	519	28,324	693·5	37,452
All other, including tacks.....	205	16,000	328	20,021
Pipes and fittings.....	23,319	1,104,434	37,031·9	1,618,181
	332,802·6	12,154,770	574,804·0	19,673,740

\*Compiled from "Commerce and Navigation of the United States, 1910." Washington, D.C.

Table continued on next page.

IRON.—TABLE 23—Continued.

## Imports of Iron and Steel into Canada from the United States.

	1909.		1910.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
<i>Builders Hardware and Tools—</i>				
Locks, hinges, and other builders hardware.....		893,807		1,272,969
Saws.....		196,278		203,262
Tools, not elsewhere specified.....		826,354		1,025,979
Car wheels..... No. 8,548		67,123	6,592	66,505
Castings, not elsewhere specified.....		644,665		904,412
<i>Cutlery—</i>				
Table.....		15,736		12,226
All other.....		65,955		109,039
<i>Firearms.....</i>		240,825		305,016
<i>Machinery, Machines and parts of—</i>				
Cash registers..... No. 726		73,263	724	45,260
Electrical machinery.....		590,152		1,151,449
Laundry machinery.....		70,618		124,325
Metal working machinery (including metal working machine tools).....		214,029		336,172
Mining machinery.....		501,725		734,631
Printing presses and parts of.....		300,752		756,493
Pumps, and pumping machinery.....		317,282		456,358
Sewing machines and parts of.....		327,696		462,128
Shoes machinery.....		107,726		228,431
Steam engines and parts of (fire).... No. 1		325	16	7,199
Steam engines and parts of (locomotive)..... “ 83		363,279	65	247,979
Steam engines and parts of (stationary)..... “ 3,337		821,498	3,173	840,418
Steam engines and parts of (traction) “ 423		721,373	1,296	2,094,247
Steam engines and parts of (all other engines and parts of engines).... “		657,926		1,366,650
Typewriting machines and parts of.....		335,237		430,737
Windmills and parts of.....		45,952		40,041
Wood working machinery.....		277,467		349,094
All other.....		5,395,675		7,343,794
Safes..... No. 2,009		88,057	2,960	136,684
Scales and balances.....		137,911		109,181
Stoves, ranges and parts of.....		443,599		635,900
All other manufactures of.....		4,504,677		6,357,049
		19,251,962		28,153,628
Total value.....		31,406,732		47,827,368

## LEAD.

The following statistics of the production of lead in Canada in 1910, are based on direct smelter returns and represent the amount of lead refined in Canada and shipped as pig lead or manufactured products.

The 1910 output was entirely from the mines of British Columbia, and a considerable decrease is shown, the production being 32,987,508 pounds in that year, against 45,857,424 for 1909.

In valuing the lead production for 1910, the average price per pound at Toronto<sup>1</sup> has been used. The New York market is practically closed to Canadian lead by high tariff, and to the London market price must be added the freight, &c., to reach the Canadian market. The price at Montreal or Toronto is lower than that at New York, and higher than that at London, and is probably a more equitable valuation to place upon the Canadian production.

Statistics showing the lead production since 1887 are given in the following table:—

LEAD.—TABLE 1.  
Annual Production.

Calendar Year.	Lbs.	Price per Lb.	Value.	Calendar Year.	Lbs.	Price per Lb.	Value.
		Cts.	\$			Cts.	\$
1887.....	204,800	5·400	9,216	1899.....	21,862,436	4·470	977,250
1888.....	674,500	4·420	29,812	1900.....	63,169,821	4·370	2,760,521
1889.....	165,100	3·930	6,488	1901.....	51,900,958	4·331	2,249,387
1890.....	105,000	4·480	4,704	1902.....	22,956,381	4·069	934,095
1891.....	88,665	4·350	3,857	1903.....	18,139,283	4·237	768,562
1892.....	808,420	4·090	33,064	1904.....	37,531,244	4·309	1,617,221
1893.....	2,135,023	3·730	79,636	1905.....	56,864,915	4·707	2,676,632
1894.....	5,703,222	3·290	187,636	1906.....	54,608,217	5·657	3,089,187
1895.....	16,461,794	3·230	531,716	1907.....	47,738,703	5·325	2,542,086
1896.....	24,199,977	2·980	721,159	1908.....	43,195,733	4·200	1,814,221
1897.....	39,018,219	3·580	1,396,853	1909.....	45,857,424	*3·690	1,692,139
1898.....	31,915,319	3·780	1,206,399	1910.....	32,987,508	3·687	1,216,249

\* In 1909 and 1910, average prices at Toronto as quoted by *Hardware and Metal*; in previous years average prices at New York, as quoted by *Engineering and Mining Journal*.

Previous to 1904, lead ores mined in Canada were either exported as ore, or smelted in Canadian furnaces and exported in the form of base bullion to be refined abroad. A lead refinery employing the Bett's Electrolytic Process is now operated at Trail, B.C., in connection with the smelter there, and has

<sup>1</sup> At the time of compilation of these statistics the only available published record of lead prices in Canada was the Toronto price and this represented the price of lead sold in average quantities.

Producers prices for lead in large quantities rule somewhat lower than those shown in this record and as Canadian domestic lead is sold in competition with London lead, the price at Montreal which is the chief market for lead in Canada is slightly lower than that in Toronto.

witnessed frequent enlargements until it is now treating the base bullion produced from the smelting of practically all the British Columbia lead ores by the Trail smelter.

Pig lead, fine gold, fine silver, refined antimony, copper sulphate and bab-bitt metal are produced at the refinery, and lead pipe also is manufactured there. The refined lead finds a market in Canada, the United States and the Orient. Of that used in Canada a great part is consumed in the manufacture of white lead, for which the Trail product is especially valuable on account of its purity.

The production of refined lead, including pig lead and lead pipe, &c., has been as follows:—

Year.	Refined lead produced.	Year.	Refined lead produced.
1904.. .. .	7,519,440	1908.....	36,549,274
1905.....	15,804,509	1909.....	41,883,614
1906.....	20,471,314	1910.....	32,987,508
1907.....	26,607,461		

The price of lead in London averages from  $\frac{1}{2}$  to 2 cents per pound lower than in New York.

The average price for soft lead in 1910, on the London market, was £12 19s. 0d. per long ton (equivalent to 2.775 cents per pound), as compared with £13 1s. 8d. (2.803 cents per pound) in 1909, and £13 10s. 5d. (2.897 cents per pound), in 1908.

In Toronto and Montreal, lead is sold at a price intermediate between the New York and London values, the average price per pound in Toronto for 1910 being quoted as 3.687 cents per pound, as compared with 3.690 cents per pound in 1909, and 3.894 cents per pound in 1908. These prices compiled by "Hardware and Metal," represent those given on average quantities of lead sold to consumers. In car lots or large quantities lower prices could be secured.

The average price of lead in the New York market during 1908 was 4.200 cents per pound, in 1909 it rose to 4.273 cents, and in 1910 to 4.446 cents.

The monthly and yearly average prices of lead in Toronto for the past ten years, are given in the following tables:—

**\*Price of Pig Lead at Toronto in cents per pound on the first market day of each month.**

Month.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
January .....	4·875	3·625	3·500	3·300	3·600	4·800	5·400	4·250	3·750	3·750
February .....	4·875	3·625	3·500	3·300	3·800	4·800	5·400	4·500	3·800	3·750
March .....	4·875	3·625	3·500	3·300	3·550	4·800	5·875	4·125	3·750	3·750
April .....	4·875	3·625	3·500	3·300	3·625	4·400	5·550	4·000	3·750	3·700
May .....	4·375	3·625	3·500	3·300	3·800	4·400	5·550	4·000	3·750	3·700
June .....	4·375	3·625	3·500	3·250	3·800	4·400	5·450	3·750	3·650	3·650
July .....	4·375	3·625	3·500	3·250	3·800	4·500	5·550	3·600	3·650	3·650
August .....	4·375	3·625	3·500	3·250	4·000	4·350	5·500	3·600	3·600	3·650
September .....	4·375	3·500	3·500	3·250	4·000	4·600	5·250	3·600	3·600	3·650
October .....	4·125	3·250	3·500	3·500	4·000	4·950	5·500	3·750	3·650	3·650
November .....	4·250	3·500	3·375	3·500	4·100	5·500	5·500	3·750	3·650	3·650
December .....	4·125	3·500	3·300	3·600	4·100	5·250	4·625	3·800	3·700	3·700
Average .....	4·489	3·562	3·473	3·342	3·848	4·727	5·429	3·894	3·692	3·687

\* Lower could be secured for lead in car lots or large quantities, a record of which was not available at time of printing.

The average monthly prices of lead in New York as quoted in the Engineering and Mining Journal are shown in the next table.

**Monthly Average Prices of Lead in New York, in cents per pound.**

Month.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
January .....	4·35	4·000	4·075	4·347	4·552	5·600	6·000	3·691	4·175	4·700
February .....	4·35	4·075	4·075	4·375	4·450	5·464	6·000	3·725	4·018	4·613
March .....	4·35	4·075	4·442	4·475	4·470	5·350	6·000	3·838	3·986	4·459
April .....	4·35	4·075	4·567	4·475	4·500	5·404	6·000	3·993	4·168	4·376
May .....	4·35	4·075	4·325	4·423	4·500	5·685	6·000	4·253	4·287	4·315
June .....	4·35	4·075	4·210	4·196	4·500	5·750	5·760	4·466	4·350	4·343
July .....	4·35	4·075	4·075	4·192	4·524	5·750	5·288	4·447	4·321	4·404
August .....	4·35	4·075	4·075	4·111	4·665	5·750	5·250	4·580	4·363	4·400
September .....	4·35	4·075	4·243	4·200	4·850	5·750	4·813	4·515	4·342	4·400
October .....	4·35	4·075	4·375	4·200	4·850	5·750	4·750	4·351	4·341	4·400
November .....	4·35	4·075	4·218	4·200	5·200	5·750	4·376	4·330	4·370	4·442
December .....	4·15	4·075	4·162	4·600	5·422	5·900	3·658	4·213	4·560	4·500
Average .....	4·33	4·069	4·237	4·309	4·707	5·657	5·325	4·200	4·273	4·446



The average monthly prices of soft lead in London, England, as published by Julius Matton of London, and Metallgesellschaft and Frankfort-on-the-Main, were, from 1901 to 1910, as follows:—

**Average Monthly Prices of Lead in London, £ per long ton.**

Month.	1901.	1902.	1903.	1904.	1905.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
January.....	15 18 6	10 11 4	11 6 1	11 11 2	12 17 6
February.....	14 13 4	11 12 4	11 14 2	11 11 10	12 9 3
March.....	13 7 7	11 10 2	13 4 6	12 .. 9	12 5 11
April.....	12 8 5	11 11 11	12 8 1	12 5 1	12 13 2
May.....	12 5 6	11 12 ..	11 16 ..	11 15 11	12 15 3
June.....	12 6 10	11 5 5	11 8 9	11 10 5	13 .. ..
July.....	12 3 ..	11 4 8	11 7 8	11 13 4	13 12 2
August.....	11 13 10	11 2 5	11 2 11	11 14 9	13 19 2
September.....	11 19 1	10 17 10	11 3 4	11 15 9	13 19 ..
October.....	11 12 ..	10 14 11	11 2 2	12 3 9	14 13 7
November.....	11 5 4	10 14 4	11 2 2	12 17 10	15 6 9
December.....	10 10 8	10 15 1	11 3 7	12 15 6	17 1 ..
Yearly average.....	12 10 5	11 5 3	11 11 7	11 19 8	13 14 5

Month.	1906.	1907.	1908.	1909.	1910.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
January.....	16 17 6	19 16 8	14 10 6	13 3 6	13 3 11
February.....	16 0 4	19 11 6	14 5 6	13 5 5	13 7 3
March.....	15 17 9	19 14 7	14 1 4	13 8 8½	13 2 9
April.....	15 16 6	19 16 4	13 13 10	13 7 ..	12 13 9
May.....	16 13 6	19 17 7	13 2 7	13 5 3	12 11 8
June.....	16 15 6	20 6 —	12 15 7	13 2 4	12 13 9
July.....	16 11 7	20 8 2	12 19 6	12 13 3	12 11 8
August.....	17 1 3	19 5 3	13 9 10½	12 10 6	12 10 10
September.....	18 4 4	19 17 6	13 3 6	12 15 3	12 12 6
October.....	19 7 9	18 13 —	13 7 3	13 4 4	13 2 0
November.....	19 5 6	17 4 11	13 12 2	13 1 4½	13 4 6
December.....	19 12 6	14 9 4	13 3 6	13 2 11½	13 3 9
Yearly average.....	17 7 —	19 1 10	13 10 5	13 1 8	12 19 0

*Bounties.*—In 1901, and again in 1903, the Dominion Government, to encourage the lead industry, authorized the payment of a bounty on the production of lead. The Act of 1903 provided for the payment under certain restrictions of 75 cents per hundred pounds on lead contained in ore mined and smelted in Canada, provided that when the standard price of pig lead in London, England, exceeded £12 10s. per ton of 2,240 pounds, such bounty should be reduced proportionately by the amount of such excess. Thus, when the price

of lead in London rose to £16 or over per long ton, the bounty ceased. As the price of lead exceeded £16 sterling on the London market for a considerable period during 1906 and 1907 the bounty paid during those years was comparatively small.

The Act of 1903 provided that payment of bounty should cease on June 30, 1908, and as only a portion of the funds provided had been used, a new Act was passed in the latter year providing for further bounty payments at the rate of 75 cents per hundred pounds, or approximately £3 10s. per ton of 2,240 lbs., subject to the restriction that when the price of lead in London exceeds £14 10s. the bounty shall be reduced by such excess.

The Act, together with the regulation based upon it, is reproduced herewith in full.

### ACT 7-8 EDWARD VII., CHAPTER 43.

#### AN ACT RESPECTING THE PAYMENT OF BOUNTIES ON LEAD CONTAINED IN LEAD-BEARING ORES MINED IN CANADA.

*Assented to July 20th, 1908.*

Whereas under the provisions of an Act passed on the 24th day of October, 1903, being chapter 31 of the Acts of 1903, payment of a bounty on lead contained in lead-bearing ores mined in Canada, not to exceed five hundred thousand dollars in any fiscal year, was authorized to be paid until the thirtieth day of June, 1908; and whereas the total amount of bounty paid thereunder up to the thirty-first day of March, 1908, was six hundred and sixty-seven thousand four hundred and four dollars, and it is estimated that a further amount of forty-five thousand dollars will be payable on or before the thirtieth day of June, 1908, leaving unexpended about one million seven hundred and eighty-eight thousand and seventy-eight dollars of the total amount authorized to be paid under the provisions of the said chapter 31: Therefore, His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. The Governor in Council may authorize the payment of a bounty of seventy-five cents per one hundred pounds on lead contained in lead-bearing ores mined in Canada, on and after the first day of July, 1908, such bounty to be paid to the producer or vendor of such ores; Provided that the sum to be paid as such bounty shall not exceed five hundred thousand dollars in any year ending on the thirtieth day of June: Provided also that when it appears to the satisfaction of the Minister charged with the administration of this Act that the standard price of pig lead in London, England, exceeds fourteen pounds ten shillings sterling per ton of two thousand two hundred and forty pounds, such bounty shall be reduced by the amount of such excess.

2. The total amount of bounty payable under the provisions of chapter 31 of the Acts of 1903, and of this Act, shall not exceed two millions five hundred thousand dollars.

Payment of the said bounty may be made from time to time to the extent of sixty per cent upon smelter returns showing that the ore has been delivered for smelting at a smelter in Canada. The remaining forty per cent may be paid at the close of the fiscal year, upon evidence that all such ore has been smelted in Canada.

2. If at the close of any year it appears that during the year the quantity of lead produced, on which the bounty is authorized, exceeds thirty-three thousand three hundred and thirty-three tons of two thousand pounds, the rate of bounty shall be reduced to such sum as will bring the payments for the year within the limit mentioned in section 1.

3. If at any time it appears to the satisfaction of the Governor in Council that the charges for transportation and treatment of lead ores in Canada are excessive, or that there is any discrimination which prevents the smelting of such ores in Canada on fair and reasonable terms, the Governor in Council may authorize the payment of bounty at such reduced rates as he deems just, on the lead contained in such ores mined in Canada and exported for treatment abroad.

4. If at any time it appears to the satisfaction of the Governor in Council that products of lead are manufactured in Canada direct from lead ores mined in Canada without the intervention of the smelting process, the Governor in Council may make such provision as he deems equitable to extend the benefits of this Act to the producers of such ores.

5. The bounties payable under the provisions of this Act shall cease and determine on the thirtieth day of June, one thousand nine hundred and thirteen.

6. The Governor in Council may make regulations for carrying out the intention of this Act.

REGULATIONS under the provisions of the Act 7-8, Edward VII., Chapter 43, intituled: "An Act to provide for the payment of Bounty on Lead contained in the lead-bearing ores mined in Canada."

(As authorized by Order in Council on the 3rd August, 1908.)

1. The Minister of Trade and Commerce is charged with the administration of this Act.

2. All producers or vendors of lead-bearing ores who desire to avail themselves of the provisions of the Act above quoted, and to be paid bounty, shall, before making claim for such bounty, notify the Minister of their intention to claim under the provisions of the Act, and shall declare the name of the mine producing such ore, its situation, the names of the President, Secretary, and Manager, as well as the name of the official authorized to make claim. Notice shall be given the Minister of changes in ownership and management. Where the bounty is claimed by Lessees, the consent of the owner shall be shown.

3. All claims for the payment of bounty shall be made and substantiated under the oath of the Manager of the mine, or of the official authorized to make the claim.

4. Claims may be made monthly, that is immediately after the close of each calendar month, and be in such form, and contain such evidence, as may seem to the Minister from time to time necessary.

5. No claims made otherwise than in conformity with these regulations, and in form required by the Minister, shall be recognized, allowed or paid by the Minister.

6. The smelting of all such ores shall at all times be under the supervision of the officer of the Department of Trade and Commerce, appointed or detailed for the purpose.

7. The supervising officer may at any time demand and receive a portion of the floor sample of any ore delivered at the smelter for smelting purposes.

8. The rate of bounty shall be computed according to the London quotation upon the day the ore is taken into stock at the smelter, such day not to be later than the last day of the calendar month during which the ore was unloaded from cars at the smelter grounds.

9. The lead contents of ores shall for the purpose of this Act be ascertained by fire assay, as used in ordinary commercial assaying.

10. The books of the claimants, and those of the smelting works at which the ore is smelted, shall be at all times open to the inspection of such supervising officer, and of any officer of the Department of Trade and Commerce who may be detailed by the Minister for the purpose.

11. All claims shall be substantiated by the oath of the Manager of the Smelting Works at which the ores are smelted, and shall be verified and certified to by the officer of the Department of Trade and Commerce, appointed to supervise the smelting at the works where it has been carried on.

12. The cost of the supervision shall be paid by the claimants and may be deducted *pro rata* according to the quantity smelted during the fiscal year from the amount payable to such claimants at the close of each fiscal year.'

#### Statement of Bounties paid on Lead during the fiscal years 1899 to 1911.

Year ending.	Bounty paid.	Year ending.	Bounty paid.
	\$		\$
June 30, 1899.....	76,665	March 31, 1907 (9 mos.).....	1,995
" 30, 1900.....	43,335	" 31, 1908.....	51,001
" 30, 1901.....	30,000	" 31, 1909.....	307,433
" 30, 1902.....		" 31, 1910.....	340,542
" 30, 1903.....	4,380	" 31, 1911.....	248,534
" 30, 1904.....	195,627		
" 30, 1905.....	330,645	Total.....	1,720,353
" 30, 1906.....	90,196		



*Exports and Imports.*—According to Trade and Navigation reports, the total quantity of lead contained in ore and concentrates, and pig lead, *exported*, during the calendar year 1910, was 7,759,053 pounds, valued at \$249,482 as compared with 17,528,028 pounds, valued at \$493,642 in 1909.

Details of exports, 1907 to 1910, are as follows:—

### Exports of Lead 1907 to 1910.

	Lead in Ore, Concentrates, etc.		Pig Lead.	
	Lbs.	Value.	Lbs.	Value.
1907		\$		\$
To United States .....	13,817,389	532,235	4,590	230
To other countries .....	8,160,788	333,706	3,609,116	163,727
Totals .....	21,978,177	865,941	3,613,706	163,957
1908				
To United States .....	719,086	20,514	168,866	5,329
To other countries .....	3,792,845	132,880	13,773,797	463,731
Totals .....	4,511,931	153,394	13,942,663	469,060
1909				
To United States .....	6,096,852	126,478	280	8
To other countries .....	129,216	6,100	11,301,680	361,056
Totals .....	6,226,068	132,578	11,301,960	361,064
1910				
To United States .....	46,800	1,308	59,605	2,295
To other countries .....			7,652,648	245,879
Totals .....	46,800	1,308	7,712,253	248,174

The exports of lead since 1873 are shown in Table 2:—

### LEAD.—TABLE 2.

### Exports of Lead.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1873 .....		1,993	1892 .....		2,509
1874 .....		127	1893 .....		3,099
1875 .....		7,510	1894 .....	5,792,700	144,509
1876 .....		66	1895 .....	23,075,892	435,071
1877 .....		720	1896 .....	26,480,320	462,095
1878 .....			1897 .....	43,802,697	925,144
1879 .....		230	1898 .....	37,375,678	885,485
1880 .....			1899 .....	15,799,518	466,950
1881 .....			1900 .....	57,642,029	1,917,690
1882 .....		32	1901 .....	45,590,995	1,804,687
1883 .....		5	1902 .....	17,761,484	457,170
1884 .....		36	1903 .....	18,624,303	426,466
1885 .....			1904 .....	25,868,823	559,461
1886 .....			1905 .....	41,657,403	1,046,541
1887 .....		724	1906 .....	21,436,022	736,007
1888 .....		18	1907 .....	25,591,883	1,029,898
1889 .....		18	1908 .....	18,454,594	622,454
1890 .....			1909 .....	17,528,028	493,642
1891 .....		5,000	1910 .....	7,759,053	249,482



The principal imports of lead during the calendar years 1909 and 1910, and the fiscal year 1911, were as follows:—

	Cal. year 1909.		Cal. year 1910.		Fiscal year 1911.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
Old, scrap, pig and block. ....	5,649	184,572	6,030	346,516	5,833	334,159
Bars and sheets. ....	671	44,073	885	45,674	779	55,312
Pipe. ....	71	4,884	202	15,365	237	17,985
Shot and bullets. ....	5	489	3	311	5	447
Manufactures of lead. ....	.....	102,370	.....	107,688	.....	106,805
Tea lead. ....	1,113	116,461	1,186	117,399	1,119	110,011
Litharge. ....	852	58,100	777	56,049	827	59,987
Total. ....	7,822	510,949	9,083	689,002	8,800	684,706
Metallic lead contained in imported lead pigments. ....	1,514	.....	1,461	.....	1,527	.....
	9,336	.....	10,544	.....	10,327	.....

Statistics of the annual imports since 1880 of lead and manufactures of lead, are shown in Tables 3 and 4; imports of litharge in Table 5; and imports of dry white and red lead in Table 6.

## LEAD.—TABLE 3.

## Imports of Lead.

Fiscal Year.	OLD, SCRAP, AND PIG.		BARS, BLOCKS, SHEETS.		TOTAL.	
	Cwt.	Value.	Cwt.	Value.	Cwt.	Value.
1880.....					30,298	\$124,117
1881.....	16,236	\$ 56,919	18,222	\$70,744	34,458	127,663
1882.....	36,655	120,870	10,540	35,728	47,195	156,598
1883.....	48,680	148,759	8,591	28,785	57,371	177,544
1884.....	39,409	103,413	9,704	28,458	49,113	131,871
1885.....	36,106	87,038	9,362	24,396	45,468	111,434
1886.....	39,945	110,947	9,793	28,948	49,738	139,895
1887.....	61,160	173,477	14,153	41,746	75,313	215,223
1888.....	68,678	196,845	14,957	45,900	83,635	242,745
1889.....	74,223	213,132	14,173	43,482	88,396	256,614
1890.....	101,197	283,096	19,083	59,484	120,280	342,580
1891.....	86,382	243,033	15,646	48,220	102,028	291,253
1892.....	97,375	254,384	11,299	32,368	108,674	286,752
1893.....	94,485	215,521	12,403	32,286	106,888	247,807
1894.....	70,223	149,440	8,486	20,451	78,709	169,891
1895.....	67,261	139,290	6,739	16,315	74,000	155,605
1896.....	72,433	173,162	8,575	23,169	81,008	196,331
1897.....	65,279	158,381	10,516	29,175	75,795	187,556

	OLD, SCRAP, PIG, AND BLOCK.*		BARS AND SHEETS. †		TOTAL.	
1898.....	88,420	\$ 260,779	22,214	\$39,041	110,634	\$299,820
1899.....	114,659	283,432	44,796	39,833	159,455	323,265
1900.....	62,361	207,819	15,493	53,506	77,854	251,325
1901.....	(a) 85,321	97,011	16,295	78,316	101,616	175,327
1902.....	(a) 122,279	104,672	18,596	49,261	140,875	153,933
1903.....	(a) 98,530	67,821	11,535	35,398	110,065	103,219
1904.....	(a) 94,602	121,165	14,102	39,644	108,704	160,809
1905.....	(a) 57,074	133,775	17,792	51,972	74,866	185,747
1906.....	82,729	271,105	16,106	57,185	98,835	328,290
1907.....	79,575	277,470	13,710	56,630	93,285	334,100
1908.....	63,921	284,604	17,253	75,186	81,174	359,790
1909.....	50,110	151,173	13,754	46,093	63,864	197,266
1910.....	113,249	191,971	11,446	37,004	124,695	228,975

\* Duty 15 per cent.

† Duty 25 per cent.

(a) Includes Canadian lead ore sent to the United States for refining, imported at price of refining only.

LEAD.—TABLE 4.

## Imports of Lead Manufactures.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1880.....	\$ 15,400	1891.....	\$ 23,898	1902.....	\$ 120,020
1881.....	22,629	1892.....	22,636	1903.....	134,151
1882.....	17,282	1893.....	33,783	1904.....	129,093
1883.....	25,556	1894.....	29,361	1905.....	147,177
1884.....	31,361	1895.....	38,015	1906.....	163,793
1885.....	36,340	1896.....	50,722	1907.....	162,425
1886.....	33,078	1897.....	60,735	1908.....	243,926
1887.....	19,140	1898.....	63,179	1909.....	213,167
1888.....	18,816	1899.....	91,497	1910.....	234,930
1889.....	16,315	1900.....	104,736		
1890.....	25,600	1901.....	107,260		

LEAD.—TABLE 5.

## Imports of Litharge.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
1880.....	3,041	\$ 14,334	1891.....	7,979	\$ 27,613	1902.....	13,002	\$ 47,021
1881.....	6,126	22,129	1892.....	10,384	34,343	1893.....	13,921	47,761
1882.....	4,900	16,651	1893.....	7,685	24,401	1904.....	9,894	32,633
1883.....	1,532	6,173	1894.....	38,547	28,685	1905.....	17,865	57,736
1884.....	5,235	18,132	1895.....	11,955	32,953	1906.....	10,165	39,836
1885.....	4,990	16,156	1896.....	10,710	32,817	1907.....	11,311	49,183
1886.....	4,928	16,003	1897.....	12,028	34,538	1908.....	19,052	90,785
1887.....	6,397	21,865	1898.....	11,446	32,904	1909.....	12,117	43,597
1888.....	7,010	23,808	1899.....	9,530	32,518	1910.....	18,101	62,174
1889.....	8,089	31,082	1900.....	9,139	29,176			
1890.....	9,453	31,401	1901.....	11,132	51,944			

The imports of white and red lead and orange mineral in 1910, amounted to 3,769,927 pounds, valued at \$143,741. In 1903, the imports were 19,208,786 pounds, the falling off being due to the establishment of corroding works at Montreal.

Detailed statistics of imports of lead pigments during the calendar years 1909 and 1910, and the fiscal year 1911, are as follows; the statistics of imports since 1885 being shown in Table 6:—

## Imports of White and Red Lead in 1909, 1910 and 1911.

	Calendar Year 1909.		Calendar Year 1910.		Fiscal Year 1911.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
Lead, white, dry.....	2,690,575	\$ 95,894	2,076,629	\$ 75,463	2,937,838	\$ 91,480
Lead, white, ground in oil ...	730,001	32,678	811,510	37,475	840,084	38,910
Lead, red, dry and orange mineral.....	516,032	25,341	881,788	31,803	729,169	31,499
	3,936,608	\$ 153,913	3,769,927	\$ 144,741	3,967,091	\$ 161,889

## LEAD.—TABLE 6.

## Imports of Dry White and Red Lead and Orange Mineral, and White Lead Ground in Oil.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
1885.....	5,540,753	\$ 198,913	1898.....	12,682,808	418,659
1886.....	6,703,077	213,258	1899.....	14,507,945	514,842
1887.....	6,998,820	233,725	1900.....	14,679,920	634,492
1888.....	6,361,334	216,654	1901.....	10,241,601	461,368
1889.....	7,066,465	267,236	1902.....	15,584,164	603,582
1890.....	10,859,672	381,959	1903.....	19,208,786	758,371
1891.....	8,560,615	337,407	1904.....	16,925,585	662,098
1892.....	10,288,766	351,686	1905.....	17,376,588	638,381
1893.....	10,865,183	364,680	1906.....	10,412,891	417,444
1894.....	10,958,170	353,053	1907.....	5,956,626	290,629
1895.....	8,780,052	282,353	1908.....	7,830,860	420,537
1896.....	11,711,496	367,569	1909.....	4,687,416	195,258
1897.....	10,310,463	347,539	1910.....	3,585,921	141,114

The production of refined lead as already shown was, in 1910, 16,494 tons, while the exports of pig lead were 3,856 tons, leaving 12,633 tons as the consumption of Canadian lead.

The imports of lead during the calendar year 1910, are shown above to have been 10,544 tons, not including certain manufactures of lead valued at \$107,688, so that the total consumption of lead in 1910 probably exceeded 23,500 tons.

## Nova Scotia.

There has been no production from this province during the year. The King Edward Exploration, Smelting, Refining and Milling Company of Cape Breton, Limited, discontinued work at Rear Boisdale.

Bessie Dunbrack, et al, at Musquodoboit, continued prospecting and development work, and report a quantity of bullion ready for shipment.

## Ontario.

There has been no production from this province during the last two years.

## British Columbia.

As already stated, all the production in 1910 was from British Columbia mines, and there was a decrease from the previous year as shown by Table 7 following:—

LEAD.—TABLE 7.

## British Columbia:—Production.

Calendar Year.	Lbs.	Value.	Price per Pound.	Calendar Year.	Lbs.	Value.	Price per Pound.
		\$	Cts.			\$	Cts.
1887.....	204,800	9,216	4 40	1899....	21,862,436	977,250	4 470
1888.....	674,500	29,813	4 42	1900....	63,158,621	2,760,031	4 370
1889.....	165,100	6,488	3 93	1901....	51,582,906	2,235,603	4 334
1890.....	Nil.			1902....	22,536,381	917,005	4 069
1891.....	Nil.			1903....	18,089,283	766,443	4 237
1892.....	808,420	33,064	4 09	1904....	36,646,244	1,579,086	4 309
1893.....	2,131,092	79,490	3 73	1905....	56,580,703	2,663,254	4 707
1894.....	5,703,222	187,686	3 29	1906....	52,408,217	2,964,733	5 657
1895.....	16,461,794	531,716	3 23	1907....	47,738,703	2,542,086	5 325
1896.....	24,199,977	721,159	2 98	1908....	43,195,733	1,814,221	4 200
1897.....	38,841,135	1,390,513	3 58	1909....	45,857,424	1,692,139	*3 650
1898.....	31,693,559	1,198,017	3 78	1910....	32,987,508	1,216,249	3 687

\* Average prices at Toronto for years 1909 and 1910. For previous years average prices at New York.

LEAD.—TABLE 8.

## British Columbia:—Production by Districts.\*

	1905.	1906.	1907.	1908.	1909.	1910.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Cassiar.....	5,500					1,695
East Kootenay—						
Fort Steele.....	48,248,828	44,487,481	37,526,194	30,204,788	27,004,528	23,874,562
Other Districts..	149,584	167,691	73,842	358,270	18,724	66,010
West Kootenay....						
Ainsworth.....	1,002,114	3,173,353	3,654,775	4,790,216	10,298,343	2,558,353
Nelson.....	1,368,388	1,034,553	1,582,113	345,424	1,097,069	1,245,844
Slocan.....	5,399,330	2,975,674	4,305,826	6,572,268	4,976,199	6,406,358
Other Districts...	339,883	469,000	570,534	903,552	979,916	470,241
Yale.....	67,076	100,465	25,419	21,215	21,567	35,584
	56,580,703	52,408,217	47,738,703	43,195,733	44,396,346	34,658,746

\*From the Report of the Minister of Mines, B. C.

The falling off in the output of this province was largely due to the destruction caused by forest fires in the Slocan.

Not only were mine buildings burned, but many bridges and trestles along the right-of-way of the Kaslo and Slocan railway were destroyed, and the rail-



way, in consequence of the heavy loss, ceased operation. As a result of the fire losses, and the derangement of transportation facilities, several mines in this section ceased shipments. It is to be regretted that several miners lost their lives in these fires.

The Blue Bell Mine in Ainsworth district, one of the leading producers of lead in 1909 suspended operations early in 1910, as did the North Star mine in East Kootenay; and the St. Eugène mine shipments fell off considerably.

Against these decreases may be placed the advent of the Sullivan mine near Kimberly, East Kootenay, into the list of shippers. This well known property was bonded at the close of 1909 by the Consolidated Mining and Smelting Company of Canada, Ltd., owners of the Trail smelter.

The Standard mine in the Slocan, was re-opened by American capitalists, and promises to come to the front among the lead producers.

Direct returns give the shipments for 1910 from 46 mines as 53,355 tons of lead ore and concentrates, with an assay content of some 35,116,312 pounds of lead.

## NICKEL.

The mining and metallurgical treatment of the nickel-copper ores of the Sudbury district of Ontario, has become one of the most important of Canada's metal mining industries, and special interest is attached to this industry because of the fact that these deposits at the present time supply a very large portion of the world's demand for nickel, and also because the present known available supplies of ore in the district appear to be sufficient for many years' operations. Additional interest is now lent to these ores by the discovery of the valuable properties possessed by the new alloy of nickel and copper recently introduced to commerce under the name of monel metal, of which some particulars were given in the report for 1908.

These nickel-copper ore deposits have already been the subject of special reports by the Geological Survey at Ottawa, and the Ontario Bureau of Mines at Toronto, to which reference may be made for comprehensive descriptions of the geology of the district.

The production of ore and its reduction to a bessemer matte, was carried on during 1910 to a greater extent than in any previous year. There were mined during the year 652,392 tons of ore, much of which is subjected to open air heap roasting before being smelted. There were smelted 628,947 tons, from which were produced 35,033 tons of Bessemer matte, carrying approximately 18,636 tons of nickel and 9,630 tons of copper. The net value of the matte was returned as \$5,380,064. The matte, which is shipped to the United States and Great Britain for refining, carries from 77 to 82 per cent of the combined metals, having averaged for the past year 53.2 per cent of nickel and 27.5 per cent in copper.

For the production of monel metal a special matte is produced with contents of 22 per cent copper and 58 per cent nickel, which is included in the total given above. Monel metal is produced from this special matte without the intermediate refining of either the nickel or copper.

Compared with 1909, there was an increase in matte production in 1910 of 9,180 tons, or 35.5 per cent, and the increase in total nickel content of matte was 5,495 tons, or 41.8 per cent. The total copper content of the matte was 9,630 tons, an increase of 1,757 tons, or 22.3 per cent over the previous year.

The following were the aggregate results of the operations on the nickel-copper deposits of Ontario during the past four years:—

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<sup>1</sup> No. 873. Report on nickel and copper deposits of Sudbury, Ont., by A. E. Barlow, Geological Survey of Canada, 1901.

The Sudbury Nickel Region, by A. P. Coleman, Bureau of Mines, Vol. XIV, part III, 1904.

	1907. Tons of 2,000 lbs.	1908. Tons of 2,000 lbs.	1909. Tons of 2,000 lbs.	1910. Tons of 2,000 lbs.
Ore mined .....	351,916	409,551	451,892	652,392
Ore smelted.....	359,076	360,180	462,336	628,947
Bessemer matte produced.....	22,041	21,197	25,845	35,033
" " shipped.....	22,025	21,210		
Copper content of matte shipped.....	6,996	7,503	7,873	9,630
Nickel " " .....	10,595	9,572	13,141	18,636
Spot value of matte shipped.....	\$3,289,382	\$2,930,989	\$3,913,017	\$5,380,064
Wages paid.....	1,278,694	1,286,265	1,234,904	1,698,152
Men employed.....	1,660	1,690	1,573	1,882

According to Customs returns exports of nickel in matte, &c., were for twelve months ending December 31, as follows:—

	1906. Pounds.	1907. Pounds.	1908. Pounds.	1909. Pounds.	1910. Pounds.
To Great Britain.....	2,716,892	2,518,338	2,554,486	3,843,763	5,335,331
To United States.....	17,936,953	16,857,997	16,865,407	21,772,635	30,679,451
	20,653,845	19,376,335	19,419,893	25,616,398	36,014,782

The above figures of production do not include the nickel content of the silver-cobalt ores from the Cobalt district, of which it is difficult to obtain complete statistics. The shippers of silver-cobalt ores receive no return for the nickel content, although this metal forms an important constituent of the ore and is possibly, to some extent, saved by the refiners. Plants have been established by the Coniagas Reduction Company at Thorold, and the Deloro Mining and Reduction Company at Deloro, for the recovery of nickel and cobalt oxides.

During 1910, there were shipped from the cobalt-silver smelting works of Ontario, 108,178 pounds of mixed oxides of cobalt and nickel valued at \$18,769, in addition to 13,508 pounds of cobalt oxide, valued at \$9,630.

*Bounty on Refined Nickel and Nickel Oxide.*—Under the terms of "The Metal Refining Bounty Act," 1907, of the province of Ontario (7 Edward VII., Chap. XIV.), a bounty is authorized to be paid on nickel-cobalt, copper and arsenic under certain conditions and restrictions during a period of five years following the passing of the Act (April, 1907).

The sections affecting nickel are as follows:—

"The treasurer of the province may, under the authority of such regulations as may from time to time be made in that behalf by the Lieutenant-Governor in Council, pay in each year to the refiners of the metals or metal compounds hereinafter specified, when refined in the province from

ores raised and mined in the province, a bounty upon each pound of such metal or compound so refined as follows:—

“Class 1.—On refined metallic nickel or on refined oxide of nickel, 6 cents per pound on the free metallic nickel or on the nickel contained in the nickel oxide; but nickel upon which a bounty has already been paid in one form of product shall not be entitled to any further bounty in any other form; and the amount to be paid as bounty on the nickel products herein mentioned is not to exceed in all \$60,000 in any one year.”

The price of refined nickel in New York during 1910 was quoted at from 40 to 45 cents per pound. The quotations at the end of December being “large lots contract basis 40 to 45 cents a lb. Retail spot from 50 cents for 500 lbs. up to 55 cents for 200 lb. lots. The price of electrolytic is 5 cents higher.” During 1909 the price of refined nickel was quoted in New York at from 40 to 50 cents per pound according to size and terms of order.

Statistics of the quantities of nickel contained in matte produced are shown in the following table, the values being based on the final value of the metal, either as refined nickel or monel metal.

Statistics of the quantities of ore mined and smelted, matte produced, &c., will be found in the chapter on smelter production, pages 00.

NICKEL.—TABLE 1.

Annual Production.

Calendar Year.	Pounds of Nickel in Matte Shipped.	Average Price per lb.	Value.	Calendar Year.	Pounds of Nickel in Matte Shipped.	Average Price per lb.	Value.
		Cts.	\$			Cts.	\$
1889.....	*830,477	60	498,286	1900.....	7,080,227	47	3,327,707
1890.....	1,435,742	65	933,232	1901.....	9,189,047	50	4,594,523
1891.....	4,035,347	60	2,421,208	1902.....	10,693,410	47	5,025,903
1892.....	2,413,717	58	1,399,956	1903.....	12,505,510	40	5,002,204
1893.....	3,982,982	52	2,071,151	1904.....	10,547,883	40	4,219,153
1894.....	4,907,430	38½	1,870,958	1905.....	18,876,315	40	7,550,526
1895.....	3,888,525	35	1,360,984	1906.....	21,490,955	42	8,948,834
1896.....	3,397,113	35	1,188,990	1907.....	21,189,793	45	9,535,407
1897.....	3,997,647	35	1,399,176	1908.....	19,143,111	43	8,231,538
1898.....	5,517,690	33	1,820,838	1909.....	26,282,991	36	9,461,877
1899.....	5,744,000	36	2,067,840	1910.....	37,271,033	30	11,181,310

\* Calculated from shipments made by rail.

The companies engaged in mining and smelting nickel ores are:—

The Canadian Copper Company (The International Nickel Company) of Copper Cliff, Ont., and New York.

The Mond Nickel Company, Victoria Mines, Ont., and London, England.

Reference has already been made to the occurrence of nickel as one of the minor constituents of the silver ores of the Cobalt district. The quantity of



nickel contained in the ores shipped from this district has been estimated by the Ontario Bureau of Mines as follows:—

Year.	Ore shipped.	Nickel content
	Tons.	Tons.
1904.....	158	14
1905.....	2,144	75
1906.....	5,335	160
1907.....	14,788	370
1908.....	25,624	612
1909.....	30,677	766
1910.....	34,282	604

A large portion of these ores, particularly the high grade, is now being reduced at Copper Cliff, Thorold, and Deloro, and as already mentioned cobalt and nickel oxides are being recovered in addition to silver bullion and white arsenic.

Statistics of the exports of nickel as compiled from the Customs Department's reports are shown in Table 2, and the imports in Table 3.

NICKEL.—TABLE 2.

Exports of Nickel contained in Ore, Matte, or other Product.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Lbs.	Value.
	\$		\$			\$
1890.....	89,568	1897.....	723,130	1903.....	12,699,227	1,116,099
1891.....	667,280	1898.....	1,019,363	1904.....	11,233,869	1,091,349
1892.....	293,149	1899.....	939,915	1905.....	17,318,059	1,569,693
1893.....	629,692	1900.....	1,031,030	1906.....	20,653,845	2,042,965
1894.....	559,356	1901.....	751,030	1907.....	19,376,335	2,280,374
1895.....	521,783	1902.....	1,007,211	1908.....	19,419,893	1,866,624
1896.....	658,213			1909.....	25,616,398	2,676,483
				1910.....	36,014,782	4,030,040

NICKEL.—TABLE 3.

Imports of Nickel and Nickel Anodes.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1890.....	3,154	1897.....	4,737	1904.....	14,682
1891.....	3,889	1898.....	5,882	1905.....	19,076
1892.....	3,208	1899.....	9,449	1906.....	15,976
1893.....	2,905	1900.....	6,988	1907.....	19,511
1894.....	3,528	1901.....	12,029	1908.....	36,870
1895.....	4,267	1902.....	15,448	1909.....	14,930
1896.....	4,787	1903.....	26,177	1910.....	23,266



The only other important producer of nickel ore outside of Canada is the French colony of New Caledonia. The exports of nickel ore from this source since 1898 have been as follows in metric tons:—

### Exports of Nickel Ore from New Caledonia.<sup>1</sup>

Year.	Metric tons.	Year.	Metric tons.	Year.	Metric tons.
1898.....	53,200	1902.....	129,653	1906.....	118,890
1899.....	103,908	1903.....	77,360	1907.....	120,106
1900.....	100,319	1904.....	98,655	1908.....	108,000
1901.....	133,814	1905.....	125,289	1909.....	86,000

<sup>1</sup> Statistique de l'Industrie Minérale en France et en Algérie, Paris.

The nickel ore of New Caledonia carries about 6½ per cent of nickel.

Practically all of the above ore is smelted in France, Germany and England.

The production of raw nickel at smelting works (partly estimated), is given by the 'Metallgesellschaft' as follows, in metric tons:—

### Production of Raw Nickel at Smelting Works, in Metric Tons.

Producing Country.	1903	1904	1905	1906	1907	1908	1909	1910
United States of North America and Canada.....	5,100	6,000	4,500	6,500	6,500	7,000	9,000	10,000
England.....	1,700	2,200	3,100	3,200	3,200	3,000	3,200	3,500
Germany (1).....	1,600	2,000	2,700	2,800	2,600	3,000	3,500	4,500
France.....	1,500	1,800	2,200	1,800	1,800	1,400	1,200	1,500
Other Countries.....						200	400	600
Total production (2).....	9,900	12,000	12,500	14,300	14,100	14,600	17,300	20,100

(1) The figures of production stated for Germany only cover the output in the Kingdom of Prussia; nickel is also produced in the Kingdom of Saxony, but no data are obtainable of this production, which is however, not important.

(2) The entire production of nickel, apart from quite insignificant quantities obtained in Germany, Norway, and the United States of America, comes from New Caledonian and Canadian ores.

Statistics of the average yearly prices of nickel in Europe are also given by the same authority as follows:—

Yearly Average Prices of Nickel in Europe in Cents per Pound, and Marks per Kilogram.

Year.	Prices in Marks per Kilo.	Cents per Lb.	Year.	Prices in Marks per kilo.	Cents per Lb.
1889.....	4·50	48·6	1900.....	3·00	32·4
1890.....	4·50	48·6	1901.....	3·00	32·4
1891.....	4·50	48·6	1902.....	3·20	34·6
1892.....	4·50	48·6	1903.....	3·30	35·6
1893.....	3·80	41·0	1904.....	3·30	35·6
1894.....	3·60	38·9	1905.....	3·30	35·6
1895.....	2·60	28·1	1906.....	3·80	41·0
1896.....	2·50	27·0	1907.....	3·50	37·8
1897.....	2·50	27·0	1908.....	3·25	35·2
1898.....	2·50	27·0	1909.....	3·25	35·2
1899.....	2·50	27·0	1910.....	3·25	35·2

Mark=23·8 cents.      Kilogram=2·20462 lbs.

## SILVER.

Owing to the rapid development of the Cobalt silver camp in Ontario during the past five years, the production of silver in Canada has, in point of value, taken second place in the list of our mineral productions, being exceeded only by coal.

The total production of silver in 1910, including that produced as bullion and the metal estimated as recovered from ores sent to smelters or otherwise treated, was reported as 32,869,264 fine ounces, which compared with a production of 27,529,473 ounces in 1909, shows an increase of 19.4 per cent.

The average value of fine silver in 1910, according to New York quotations, was 53.486 cents per ounce as compared with an average value of 51.503 cents in 1909, an increase of about 3.85 per cent.

The total value of the silver production in 1910, was \$17,580,455, an increase of \$3,401,951, or 24 per cent over the value, \$14,178,504, in 1909.

A comparison of the production of 1909 and 1908, shows an increase of 1909 of 5,423,240 ounces or 24.5 per cent in quantity, and \$2,492,265, or 21 per cent in value, the average price in 1909 having decreased about 2.6 per cent from 1908.

Statistics of the annual production of silver since 1887, are shown in Table 1.

SILVER.—TABLE 1.  
Annual Production, 1887-1910.

Year.	Ozs.	Value.	Average price. per oz.	Year.	Ozs.	Value.	Average price per oz.
		\$	Cts.			\$	Cts.
1887.....	355,083	347,271	98.00	1899.....	3,411,644	2,032,658	59.58
1888.....	437,232	410,998	94.00	1900.....	4,468,225	2,740,362	61.33
1889.....	383,318	358,785	93.60	1901.....	5,539,192	3,265,354	58.95
1890.....	400,687	419,118	104.60	1902.....	4,291,317	2,238,351	52.16
1891.....	414,523	409,549	98.00	1903.....	3,198,581	1,709,642	53.45
1892.....	310,651	272,130	86.00	1904.....	3,577,526	2,047,095	57.22
1893.....		330,128	77.00	1905.....	6,000,023	3,621,133	60.35
1894.....	847,697	534,049	63.00	1906.....	8,473,379	5,659,455	66.79
1895.....	1,578,275	1,030,299	65.28	1907.....	12,779,799	8,348,659	65.33
1896.....	3,205,343	2,149,503	67.06	1908.....	22,106,233	11,686,239	52.86
1897.....	5,558,456	3,323,395	59.79	1909.....	27,529,473	14,178,504	51.50
1898.....	4,452,333	2,593,929	58.26	1910.....	32,869,264	17,580,455	53.49

From 1887 to 1893, the production ranged in value between \$300,000 and \$400,000, and was derived chiefly from the provinces of Ontario and Quebec. The next three years saw a rapid increase in the production due to the development of the silver-lead ore deposits in British Columbia, and in 1896 a pro-

duction of over \$2,000,000 is recorded. From that year until 1905 the production varied from \$2,000,000 to \$3,500,000, rising rapidly during the next five years to \$17,580,455 in 1910, as a result of the discovery of the rich ores of the Cobalt district. Ontario, in 1905, produced 40.9 per cent of the total output. In 1906 this was increased to 63.7 per cent, and in 1907 to 78.1 per cent. In 1909 the production obtained from Ontario was 90.2 per cent, and in 1910 almost 92.4 per cent, and was practically all from the Cobalt district, the contribution of British Columbia being 7.3 per cent.

Statistics of the annual production in each province are separately shown in Table 2.

SILVER.—TABLE 2.

## Production by Provinces, 1887-1910.

Calendar Year.	ONTARIO.		QUEBEC.		BRITISH COLUMBIA.		YUKON TERRITORY.	
	Ozs.	Value.	Ozs.	Value.	Ozs.	Value.	Ozs.	Value.
		\$		\$		\$		\$
1887.....	190,495	186,304	146,898	143,666	17,690	17,301		
1888.....	208,064	195,580	149,388	140,425	79,780	74,993		
1889.....	181,609	169,986	148,517	139,012	53,192	49,787		
1890.....	158,715	166,016	171,545	179,436	70,427	73,666		
1891.....	225,633	222,926	185,584	183,357	3,306	3,266		
1892.....	41,581	36,425	191,910	168,113	77,160	67,592		
1893.....		8,689		126,439		195,000		
1894.....			101,318	63,830	746,379	470,219		
1895.....			81,753	53,369	1,496,522	976,930		
1896.....			70,000	46,942	3,135,343	2,102,561		
1897.....	5,000	2,990	80,475	48,116	5,472,971	3,272,289		
1898.....	85,000	49,521	74,932	43,655	4,292,401	2,500,753		
1899.....	202,000	120,352	40,231	23,970	2,939,413	1,751,302	230,000	137,034
1900.....	161,650	99,140	58,400	35,817	3,958,175	2,427,548	290,000	177,857
1901.....	151,400	89,250	41,459	24,440	5,151,333	3,036,711	195,000	114,953
1902.....	145,000	75,632	42,500	22,168	3,917,917	2,043,586	185,900	96,965
1903.....	17,777	9,502	28,600	15,287	2,996,204	1,601,471	156,000	83,382
1904.....	206,875	118,376	15,000	8,583	3,222,481	1,843,935	133,170	76,201
1905.....	2,451,356	1,479,442	19,620	11,841	3,439,417	2,075,757	89,630	54,093
1906.....	5,401,766	3,607,894	17,686	11,813	2,990,262	1,997,226	63,665	42,522
1907.....	9,982,363	6,521,178	16,000	10,452	2,745,448	1,793,519	35,988	23,510
1908.....	19,398,545	10,254,847	13,299	7,030	2,631,389	1,391,058	63,000	33,304
1909.....	24,822,099	12,784,126	13,233	6,815	2,649,141	1,364,387	45,000	23,176
1910.....	30,366,366	16,241,755	7,593	4,061	2,407,887	1,287,883	87,418	46,756

The average price of fine silver in New York during 1910 varied between a maximum of 55.635 cents per ounce in November and a minimum of 51.454 cents per ounce in March, the average being 53.486 cents per ounce.

In London the average price of silver in 1910 was 24.670 pence per standard ounce of a fineness of 0.925. For the year 1909, the average price per fine ounce in New York was 51.503 cents, the highest being 52.9 cents in May, and the lowest 50.4 cents in March of that year.

The average monthly prices of silver in New York from 1906 to 1910, and in London during 1910, are shown in tabulated form below.

## Average Monthly Prices of Silver.

Months.	NEW YORK.—CENTS PER FINE OUNCE.					LONDON.— PENCE PER STANDARD OUNCE (a)
	1906.	1907.	1908.	1909.	1910.	1910.
January.....	65·288	68·673	55·678	51·750	52·375	24·154
February.....	66·108	68·835	56·000	51·472	51·534	23·794
March.....	64·597	67·519	55·365	50·468	51·454	23·690
April.....	64·765	65·462	54·505	51·428	53·221	24·483
May.....	66·976	65·981	52·795	52·905	53·870	24·797
June.....	65·394	67·090	53·663	52·538	53·462	24·651
July.....	65·105	68·144	53·115	51·043	54·150	25·034
August.....	65·949	68·745	51·683	51·125	52·912	24·428
September.....	67·927	67·792	51·720	51·449	53·295	24·567
October.....	69·523	62·435	51·431	50·923	55·490	25·596
November.....	70·813	58·677	49·647	50·703	55·635	25·680
December.....	69·050	54·565	48·769	52·226	54·428	25·160
Average for the year.....	66·791	65·327	52·864	51·503	53·486	24·670

(a) 925 parts fine.

Important quantities of silver are now being produced in Canada, both as fine metal and as silver bullion, ranging in fineness from 850 to 998·2. Fine silver is produced at Trail, B.C., by the Consolidated Mining and Smelting Company of Canada, Limited, chiefly from the silver-lead ores of that province, and is shipped to China, the United States and to the Ottawa mint.

The annual production of fine silver at Trail since 1904 has been as follows:—

Year.	Fine Ozs.	Year.	Fine Ozs.
1904.....	551,450	1908.....	1,956,039
1905.....	1,088,328	1909.....	2,003,003
1906.....	1,263,809	1910.....	1,798,960
1907.....	1,631,422		
		Total.....	10,293,011

In Ontario ores from the Cobalt district are treated by the following companies:—

The Canadian Copper Company at Copper Cliff, Ont.

The Deloro Mining and Reduction Company, Deloro, Ont.

The Coniagas Reduction Company, St. Catharines, Ont.

In addition to these, three new companies have entered the market, the first of which received a small tonnage in 1910, and the two others hope to be ready early in 1911.

These companies are:—

Swansea Smelting and Refining Company, Swansea, Ont.

Canada Refining and Smelting Company, Orillia, Ont.

Dominion Metals, Limited, Toronto, Ont.



Silver bullion of a fineness varying from 850 to 998.2 is produced at the works, other products being white arsenic and more recently nickel and cobalt oxides or mixed oxides. The silver bullion, as a rule, finds a market in the United States and in England. The bullion shipped in 1907 contained 4,449,722 fine ounces of silver; in 1908, 11,168,689 ounces; in 1909, 14,385,985 ounces; and in 1910, 17,365,165 fine ounces. About 52.8 per cent of the total production in 1910 was therefore recovered in Canada as fine metal or as silver bullion.

### Quebec.

The small quantity of silver credited to the province of Quebec for a number of years, represents a small silver content of the pyrite ores mined at Capelton and Eustis in the Eastern Townships.

### Ontario.

From a production valued at only \$118,376 in 1904, the silver output of this province has grown to a value of over \$16,000,000 in 1910. Not only does it contribute 92 per cent of the total silver production of Canada, but it now forms a very appreciable part (estimated at over 13 per cent), of the world's production. According to returns received by this department, there were shipped during 1910, 28,684 tons of ore and 6,943 tons of concentrates, or a total tonnage of 35,627 tons, having a value of \$15,344,470, besides silver bullion produced at the mines, carrying 1,003,111 fine ounces of silver.

The silver content of ore shipped was estimated as 23,797,111 ounces, or an average of 830 ounces per ton, and of the concentrates shipped 7,111,579 ounces, or an average of 1,024 ounces per ton; the total silver content of ore, concentrates and bullion shipped from the mines being 31,911,801 ounces. The mines owners receive payment for only 93 to 98 per cent of the silver content, and in estimating and valuing the production a deduction of five per cent is made from silver contained in ore and concentrates to cover losses in smelting and refining. On this basis the silver recovery is estimated at 30,366,366 ounces, and valued at \$16,241,755. Payments for cobalt content were reported as \$51,986.

In 1909 the total shipments, including ore and concentrates, were 30,894 tons, containing 22,349,717 ounces of silver, and in 1908, 25,682 tons were reported as shipped, containing 19,398,545 ounces.

In the following table a record of shipments since 1904 is given, the figures for the first three years being those published by the Ontario Bureau of Mines.

## Silver Ore and Bullion Shipments from Cobalt Mines, 1904-1910.

Year.	SHIPMENTS.		SILVER CONTENT.		SILVER IN OUNCES, PER TON.		Silver Bullion Shipments. Fine Ounces.	Total value of Silver.
	Ore. Tons.	Concentrate. Tons.	Ore. Ounces.	Concentrate. Ounces.	Ore.	Concentrate.		
1904 .....	158		206,875		1,309			\$
1905 .....	2,144		2,451,356		1,143			118,376
1906 .....	5,335		5,401,766		1,013			1,473,192
1907 .....	14,644		9,982,363		682			3,607,894
1908 .....	25,682	*	19,398,545	*	755	*		6,521,178
1909 .....	27,835	3,059	22,349,717	3,627,819	803	1,186	143,440	10,254,847
1910 .....	28,684	6,943	23,797,111	7,111,579	830	1,024	1,003,111	12,784,126
								16,241,755

\* Included with ore.

As the camp has developed, the average grade of the ore shipped has gradually diminished, although the introduction of concentration plants in 1903, and their increased use in the future, will no doubt tend to keep the ore shipped up to a high standard.

With respect to the nickel-cobalt and arsenic contents of these ores, the mining companies have been paid for only a small portion of the cobalt content, and nothing for the nickel and arsenic; in fact in certain cases the last two are penalized.

The total metal content of these ores, as estimated by the Ontario Bureau of Mines, is shown in the next table. The figures for ore shipments and silver content, while not identical, agree very closely with those given in the previous Table.

## Total Production Cobalt Mines, 1904-1910.\*

Year.	Ore and Concentrate shipped.	METALLIC CONTENT.			
		Nickel.	Cobalt.	Arsenic.	Silver.
	Tons.	Tons.	Tons.	Tons.	Ounces.
1904 .....	158	14	16	72	206,875
1905 .....	2,144	75	118	549	2,451,356
1906 .....	5,335	160	321	1,440	5,401,766
1907 .....	14,788	370	739	2,958	10,023,311
1908 .....	25,624	612	1,224	3,672	19,437,875
1909 .....	30,677	766	1,533	4,294	25,897,825
1910 .....	34,282	604	1,098	4,897	†30,645,181
Totals .....	113,008	2,601	5,049	17,792	94,064,189

\* As per Ontario Bureau of Mines.

† Bullion shipments from Mines included.

Nearly 30 per cent of the ore shipped from Cobalt was treated in metallurgical works in Canada, and white arsenic is being produced therefrom, of which record will be found under smelter production.

While the greater number of the operating companies hold unrestricted titles to their properties, several are operated on a royalty basis on mining lands owned and leased by the Temiskaming and Northern Ontario Railway Commission. Mr. Arthur A. Cole, Mining Engineer to the Commission, has in his annual report compiled some very interesting statistics covering the whole district with respect to ore shipments, concentration, power and labour, prices paid for ore, &c., from which the following tables and extracts have been freely drawn:—

# Ore Shipments from the Cobalt District for the Years 1904 to 1910.

Shipments during 1904: Drummond, 50 tons; La Rose, 60.05 tons; Nipissing, 20 tons; McKinley-Darragh, 57 tons; Trethewey, 21 tons. Total, 158.55 tons.

Mine.	1905.	1906.	1907.	1908.	1909.	1910.	Totals, 1904-1910.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Bailey		30.00		88.80	36.85		155.65
Beaver					51.38	140.06	191.44
Buffalo	200.80	992.80	1,241.54	536.90	648.86	1,185.77	4,806.67
Casey-Cobalt.				10.00	8.50	48.40	66.90
Chambers-Ferland				223.89	517.88	885.92	1,627.69
City of Cobalt.			50.61	761.04	566.82	329.40	1,707.87
Cobalt Central.			77.33	187.99	339.01	285.62	889.95
Cobalt Lake.				225.97	95.47	296.80	618.24
Cobalt Townsite.							
Colonial.		15.00	143.22	177.71	27.35	310.99	659.27
Coniagas	30.60	422.02	40.38			178.60	233.98
Crown Reserve			2,447.37	610.25	806.93	1,268.28	5,585.45
Drummond.	32.15	274.70		657.35	3,167.52	2,814.25	6,639.12
Foster.	83.85	117.00	104.13	1,161.38	1,225.47	2,194.41	4,992.74
Green Meehan		37.03	312.13	191.20	113.90		818.08
Hargrave	28.45		98.39				135.42
Hudson Bay.						343.68	372.13
Imperial Cobalt.			149.53	1,094.23	743.64	260.33	2,247.73
Kerr Lake.			14.61				14.61
King Edward	54.95	158.35	319.76	660.24	1,173.42	5,088.78	7,455.50
(Watts)..	19.00		31.12	338.19	146.58	134.12	669.01
LaRose	607.86	854.61	2,815.45	4,843.17	6,757.21	5,131.53	21,069.88
Lawson.	14.61		61.12				75.73
McKinley-Darragh.	447.09	80.45	742.42	1,808.39	1,056.49	2,393.39	6,548.23
Nancy Helen.			30.10	201.32	116.32		347.74
Nipissing.	486.02	2,125.08	2,538.26	3,571.96	6,470.52	6,833.81	22,082.65
Nova Scotia.		43.95	272.21	237.95	224.79		778.90
North Cobalt.					6.87		6.87
O'Brien	26.32	114.18	1,491.61	3,459.51	1,419.11	608.57	7,119.30
Peterson Lake							
(Leases).....							
(Little Nipiss'g)..				40.67	39.62	313.76	394.05
(Nova Scotia)....					121.15		121.15
Provincial.				75.84		52.05	127.89
Princess.			3.93				3.93
Red Rock			45.71				45.71
Right of Way.		46.25	129.37	750.04	1,608.99	981.41	3,516.06
Rochester.						28.30	28.30
Silver Bar.				0.58			0.58
Silver Cliff.				160.44	149.06	156.84	466.34
Silver Leaf.	9.00		46.36	197.03			252.39
Silver Queen.	44.63	130.94	478.57	885.70	316.64		1,856.58
Timiskaming.			204.32	795.20	852.14	1,119.12	2,970.78
Timiskaming							
Cobalt.		20.47	67.98				88.45
Trethewey	218.58	198.48	833.58	1,408.69	1,134.50	536.64	4,351.47
University.	16.00	155.28	60.23				231.51
Victoria				0.47			0.47
Violet.	16.00	20.00					36.00
Waldman						31.99	31.99
Wyandoh.						24.15	24.15
Totals.	2,336.01	5,836.59	14,851.34	25,362.10	29,942.99	33,976.97	112,464.56



## Shipments from the Cobalt District for the Calendar Year, 1910.

Mine.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
Beaver	88.04	59.53	88.58	118.97	57.53	65.95	30.08	139.50	25.00	81.25	27.45	121.05	140.06
Buffalo	9.50			20.00	84.85	65.95	109.55	8.40	114.90	10.50	113.60		1,185.77
Casey-Cobalt			29.43	83.68	93.25	188.92	120.15	63.70	90.71	92.48	64.10	64.50	885.92
Chambers-Ferland	32.60	64.99	53.23		26.70	29.45	8.40	27.93	33.00		31.50	30.00	329.40
City of Cobalt	41.20	42.06	19.95	20.90	21.58		42.00		55.48			42.45	285.62
Cobalt Central	66.00			31.30		20.00						39.00	296.80
Cobalt Lake				7.25			14.10	86.25	29.45	20.00	60.80	25.05	310.99
Cobalt Townsite				21.80		20.42			20.75	99.64	35.30	39.00	178.60
Colonial	40.88	62.31	53.45	80.51	55.85	39.50	88.30	89.35	57.95	26.05	23.65		1,208.28
Coniagus	61.15	288.61	236.40	236.65	325.95	361.89	302.46	309.47	223.85	128.87	242.68	122.93	2,814.25
Crown Reserve	181.97									119.27	105.80	844.75	2,194.41
Drummond	330.76									30.00	988.90		2,194.41
Hargrave			20.95			30.00	59.68	30.00	61.60	51.45	30.00	60.00	343.68
Hudson Bay		31.18	30.16			51.64	28.20	57.30		31.65		30.20	260.33
Kerr Lake	152.05	363.26	300.20	625.10	279.66	719.40	703.03	600.58	210.50	666.17	313.55	155.28	5,088.72
King Edward	25.05	21.58	20.68	20.65		23.16	423.25	402.55	223.11	342.69	377.53	23.00	134.12
La Rose	366.37	567.00	717.64	434.96	567.86	412.64	198.85	243.58	284.54	284.54	300.45	305.73	5,131.53
McKinley-Darragh	71.55	32.20	258.32	120.97	192.05	138.80	198.85	644.24	606.99	623.64	787.80	932.35	2,393.39
Nipissing	384.55	409.06	510.37	628.95	242.74	479.26	583.68		31.10	59.65	64.75	71.00	6,833.81
O'Brien	48.05	65.45	63.75	93.55	29.65	31.98	21.75	27.85					608.57
Peterson Lake and Little Nipissing		85.22			49.80	28.05	47.05			32.50	13.74	57.40	313.76
Provincial					32.05						20.00		52.05
Right of Way	63.15	62.74	97.55	81.60	29.00	59.70	100.67	110.50	41.16	69.35	113.56	152.43	981.41
Rochester								28.30					28.30
Silver Cliff		33.00			25.65	21.24		25.35	25.00		26.60		156.84
Timiskaming	60.45	29.80	29.15	91.76	70.00	180.00	136.36	185.26	101.20	70.90	60.70	103.54	1,119.12
Trethewey	27.26	31.00	32.98	95.48	60.00		66.75	40.00	20.00	22.52	44.80	95.85	536.64
Waldman													31.99
Wyandoh			31.99				24.15						24.15
Totals	2,050.58	2,248.99	2,594.78	2,814.08	2,243.17	2,917.00	2,108.46	3,111.89	2,188.10	2,863.16	3,847.26	3,989.50	33,976.97



The ore produced in the years 1907 to 1910, was shipped to the following countries for treatment:—

Country.	1907.		1908.		1909 .		1910.	
	Tons.	Per cent	Tons.	Per cent	Tons.	Per cent	Tons.	Per cent
Canada.....	2,585·05	17·40	7,401·14	29·18	10,230·64	34·47	9,922·40	29·20
Great Britain....	167·34	1·13	222·08	0·88	30·25	0·10	393·73	1·15
Germany.....			299·46	1·18	106·51	0·35	232·14	·69
United States....	12,098·95	81·47	17,439·42	68·76	19,575·59	65·08	23,428·70	68·96
Total.....	14,851·34	100·00	25,362·10	100·00	29,942·99	100·00	33,976·97	100·00

With respect to concentration, Mr. Cole reports: "Thirteen reduction mills are now operating in the Cobalt district; one more is nearing completion, and several others are contemplated. Ten use water concentration, while of the other three, two, viz., the Buffalo and O'Brien, partly water and partly cyanide, and the third, viz., the Nova Scotia, uses water concentration with pan amalgamation for the concentrates and cyanidation for the tailings.

"The following list of mills shows their respective daily capacities running full load:—

Mill.	Capacity in Tons.
1 Buffalo.....	150
2 Cobalt Central (Standard Cobalt).....	100
3 Colonial.....	50
4 Coniagas.....	160
5 King Edward.....	36
6 McKinley-Darragh.....	120
7 Nipissing Reduction.....	75
8 Northern Customs.....	200
9 O'Brien.....	90
10 Nova Scotia.....	100
11 Silver Cliff.....	80
12 Timiskaming.....	80
13 Trethewey,....	100
Under construction—	
14 Hudson Bay.....	50
Total.....	1,391

"The importance of this industry is shown by the following table which gives the tonnage handled by the mills during 1910:—

Mills and Mines.	Tons Milled.	CONCENTRATES.			Concentration ratio.
		Jigs.	Tables.	Totals.	
1 Buffalo . . . . .	39,038·00	254·36	715·90	970·26	40—1
2 Cobalt Central.					
Cobalt Central. . . . .	22,350·00	120·01	184·10	304·11	73—1
Bailey . . . . .	1,333·11	8·89	15·93	24·82	54—1
Hargraves. . . . .	103·90	2·49	1·79	4·28	25—1
Hudson Bay. . . . .	252·00	4·35	3·57	7·92	34—1
Kerr Lake . . . . .	413·33	11·26	13·70	24·96	17—1
3 Colonial. . . . .	7,388·00	5·00	73·00	78·00	95—1
4 Coniagas . . . . .	38,696·90			916·70	42—1
5 King Edward. . . . .	8,793·78	37·83	105·76	143·59	61—1
6 McKinley-Darragh. . . . .	36,714·00	464·00	1,371·00	1,835·00	20—1
7 Nipissing Red. Co.					
Cobalt Lake . . . . .	200·50	1·05	3·96	5·01	40—1
Nipissing. . . . .	13,537·50	104·60	220·60	325·20	41—1
Right of Way. . . . .	97·60	3·10	3·00	6·10	16—1
8 Northern Customs.					
City of Cobalt. . . . .	9,375·93	21·62	171·93	193·55	58—1
La Rose. . . . .	32,303·05	131·35	869·62	1,000·97	32—1
9 Nova Scotia.					
Nova Scotia. . . . .	7,475·00				*
10 Peterson Lake Lease. . . . .	3,402·00				*
11 O'Brien. . . . .	25,687·50	125·50	112·00	237·50	*
12 Silver Cliff. . . . .	15,402·00	34·01	103·52	137·53	112—1
13 Timiskaming. . . . .	21,949·00	76·17	642·02	718·19	31—1
14 Trethewey . . . . .	21,000·00			208·00	101—1
Total . . . . .	305,513·10			7,141·69	39—1

\* The Nova Scotia and O'Brien are omitted from the above ratio, as they use cyanide and shipments from their mills are wholly or in large part bullion instead of ore.

"Nearly one quarter of the ore shipments from Cobalt now consist of concentrates, and this proportion is rising.

"The average extraction in the mills in the district is about 80 to 85 per cent, depending on the character of the ore, and grade of the mill heads, at an average cost of about \$3 per ton.

"The grade of ore treated will average about 25 ounces per ton, varying from 100 as a maximum down to 10 ounces per ton. Above 100 ounces it will usually pay to ship to the smelter without further treatment.

#### *Sampling.*

"A thoroughly up-to-date sampling plant was erected, and put into operation by the beginning of July, 1910, by Messrs. Campbell and Deyell of Cobalt. The site is on the La Rose property adjoining the Timiskaming and Northern Ontario Railway line towards the north of the town of Cobalt. It is thus easily accessible from wagon roads or railway.

"The plant is designed to sample the high grade output of the mines, and has a capacity of 30 tons per day.

"The approximate charges for sampling are \$7 per ton green ore, and \$5 per ton concentrates, but these prices vary according to circumstances.

"The results obtained during the six months in which the sampler has been in operation, have been excellent and have demonstrated the feasibility of correct automatic sampling as applied to even the high and irregular values existing in the Cobalt ores."

#### *Power.*

"One of the outstanding features of 1910, in the development of Cobalt, was the introduction of electric and compressed air power from the water powers of the district.

"The three companies that have developed the water-powers are:

"(1) Cobalt Power Company.

"(2) Cobalt Hydraulic Power Company.

"(3) British Canadian Power Company.

"The Cobalt Power Company has developed 3,000 horse-power at Hound Chute on the Montreal river, six miles from Cobalt, and this is delivered as electrical energy.

"The Cobalt Hydraulic Power Company has developed 4,000 to 5,000 horse-power at Ragged Chutes on the Montreal river, and compresses air by the Taylor system. The compressed air is brought to Cobalt through nine miles of 20-inch steel pipe.

"The British Canadian Power Company, formerly the Mines Power, Limited, has a capacity of 8,000 horse-power, its generating plant being 22 miles from Cobalt on the Metabitchouan river. Power is brought into Cobalt as electrical energy, where a great part of it is converted into compressed air by electrically driven air compressors.

#### *Smelting of Cobalt Ores.*

"At the commencement of 1911, there were twelve smelting companies already receiving or bidding for Cobalt ores, six being Canadian, one British, four American and one German, with a New York agency.

"The following is the list:—

1. Canadian Copper Company, Copper Cliff, Ontario.
2. Coniagas Reduction Company, St. Catharines, Ontario.
3. Deloro Mining and Reduction Company, Deloro, Ontario.
4. Canada Refining and Smelting Company, Orillia, Ontario.
5. Dominion Metals, Limited, Toronto, Ontario.
6. Swansea Smelting and Refining Company, Swansea, Ontario.
7. American Smelting and Refining Company, New York, N.Y., U.S.A.
8. Balbach Smelting and Refining Company, Newark, N.J., U.S.A.
9. Beer, Sondheimer and Company, Frankfort on Main, Germany and New York, N.Y., U.S.A.

10. Pennsylvania Smelting Company, Pittsburg, Pa., U.S.A.
11. Quirk, Barton and Company, London, England.
12. United States Metals Refining Company, New York, N.Y., U.S.A.

"The schedules offered at the end of 1910 are slightly better than at the beginning of the year as regards silver, and the returns from shipments are now more prompt. On the other hand, on account of the glutted state of the cobalt market, no payments are now made for cobalt with the exception of those made on a small tonnage shipped by the Nipissing Company to Messrs. Quirk, Barton and Company, of London, England.

"No payments are made to the mining companies for the arsenic recovered from the ores, but the returns from the sale of this by-product make it possible for the smelters to offer better terms for the silver contents."

#### *1. Canadian Copper Company, Copper Cliff, Ont.*

Recent changes have increased the capacity of the plant from 800 to 1,000 tons per month, giving a monthly output of silver of from 1,000,000 to 1,500,000 ounces. Another result of the enlargement and the changes that have been made is the quicker returns to shippers. Formerly the company paid for 70 per cent of the silver in 35 days, and 30 per cent in 90 days from sampling date. Since December 1, 1910, payments are made 70 per cent in 30 days and 30 per cent in 60 days.

All purchases are made by the Orford Copper Company of New York, and the following is the curtailed schedule for arsenical-cobalt-silver ores which went into effect December 1, 1910.

Purchaser to make payment for:

84	per cent of silver per ton of ore (2,000 lbs.) when same assays	200- 500 ounces silver.
85	" "	500- 600
87	" "	600- 800 "
90	" "	800-1,000 "
92	" "	1,000-1,300 "
93	" "	1,300-1,600 "
93½	" "	1,600-2,000 "
94½	" "	2,000-2,500 "
95	" "	2,500-3,000 "
95½	" "	3,000-4,000 "
96	" "	4,000-5,000 "
96½	" "	5,000 and over "

Ore to be delivered by seller to the Canadian Copper Company f.o.b. cars, Copper Cliff, Ont. Ore to be at shipper's risk until sampling is undertaken, as purchaser can assume no responsibility for the ore until same has been taken into its sampler.

Purchaser to sample at its expense, purchaser's and seller's representatives to be present. Assays to be made by Ledoux and Company of New York, at seller's expense, which assays are to govern in settlement.

Payment of 70 per cent of the silver returnable to the seller, as per the above scale, to be made at the New York official price for silver on the first settlement date, which shall be 30 days after the date on which sampling of



the ore is completed, and the balance, 30 per cent, on the second settlement date, on the New York official price of silver on that day, which shall be 60 days after sampling of the ore is completed. The purchaser, however, reserves the right to deliver upon either or both of the settlement dates above specified, in lieu of cash, at his option, such silver bullion (commercial bar silver) as is due the seller in settlement upon these dates, such delivery to be made in New York city.

*2. Coniagas Reduction Company, Limited, St. Catharines, Ont.*

The latest smelting tariff offered by this company for cobalt-silver ores in 1910 was dated at St. Catharines, September 20, and is as follows, a few details regarding sampling and assaying, however, being omitted.

Percentage of silver to be paid for:—

75 per cent of silver contents by commercial assay over 100 ounces and up to 200 ounces				per ton of 2,000 lbs.	
				200 ounces and over	
84	"	"	"	300	"
86	"	"	"	500	"
89	"	"	"	750	"
91	"	"	"	1,000	"
93	"	"	"	1,500	"
93 $\frac{1}{2}$	"	"	"	2,000	"
94 $\frac{1}{2}$	"	"	"	2,500	"
95	"	"	"		"

Ores containing less than 3,000 ounces per ton, are subject to a refining charge of half-cent per ounce, and ores containing less than 1,500 ounces per ton are subject to a refining charge of three quarters of a cent per ounce. Ores containing less than 1,000 ounces per ton are subject to a treatment charge of \$10 per ton in addition to the above.

Terms of payment for silver:—

Seventy-five per cent of the amount 30 days after date of weighing and sampling report.

Twenty-five per cent of amount 90 days after date of said report. Price of silver to be determined by New York quotation, as given by Messrs. Handy and Harman to Western Union Telegraph Company on dates of settlement.

All ores to be delivered f.o.b., Thorold smelter via G.T.R. in carload lots, and to be at shipper's risk and expense until sampling is undertaken.

*3. Deloro Mining and Reduction Company, Limited, Deloro, Ont.*

The Deloro smelter has a daily capacity for treating twelve to fourteen tons of high grade Cobalt ore.

Tariff on silver-cobalt ore and concentrates:—

Pay for 98 per cent of the silver contents of the ore as determined by commercial assay, on the following terms and conditions:

Treatment charge, \$25 per ton of ore.

Refining charge, three-quarters of a cent per ounce of silver contents on ore assaying 3,000 ounces and over per ton. One cent per ounce of silver con-



tents on ore assaying 2,000 to 3,000 ounces per ton. One and a half cents per ounce of silver contents on ore assaying less than 2,000 ounces per ton.

Terms of payment, 75 per cent of net proceeds at Handy and Harman's New York quotation, 30 days after completion of sampling; 25 per cent of net proceeds at Handy and Harman's New York quotation, 90 days after completion of sampling. Ore to be delivered in carload lots f.o.b., Marmora station, C. O. railway, and to be at shipper's risk until sampling is undertaken.

Weights and moisture as determined after sampling at purchaser's works to govern.

Assays governing settlement to be made by Ledoux and Company or by the Constant Herzig Company at seller's expense, with the usual provision as to umpire assay of unusual differences.

#### *4. Canada Refining and Smelting Company, Orillia, Ontario.*

This new smelting company hopes to have its plant in operation early in 1911, and is now offering the following schedule for purchase of Cobalt silver ore and concentrates:—

84	per cent of silver contents by commercial assay	200	ozs. and over per ton.	2,000	lbs.
86	"	"	"	300	"
89	"	"	"	500	"
91	"	"	"	750	"
93	"	"	"	1,000	"
93½	"	"	"	1,500	"
94½	"	"	"	2,000	"
95	"	"	"	2,500	"

Ores containing less than 3,000 ounces per ton are subject to a refining charge of  $\frac{1}{2}$  cent per ounce, and ores containing less than 1,500 ounces per ton are subject to a refining charge of  $\frac{3}{4}$  cent per ounce. Ores containing less than 1,000 ounces per ton are subject to a treatment charge of \$10 per ton in addition to above.

Terms of payment for silver, 75 per cent of amount 30 days after date of weighing and sampling report. 25 per cent of amount 90 days after date of said report.

Price of silver to be New York official quotation.

Ore to be delivered f.o.b., Orillia, carload lots at owner's risk.

Weights to be taken after milling and moisture determination.

When so desired, Campbell and Deyell's sampling and weights will be accepted as final, and in case of dispute on assays, settlement will be made on assays of Campbell and Deyell as umpire, or such other umpire as may be mutually agreed upon by parties.

#### *5. Dominion Metals, Limited, Toronto, Ontario.*

"The Dominion Metals, Limited, did not enter the market for the purchase of silver ore until the beginning of 1911. A schedule dated 9th January, 1911, allowed a small payment for cobalt contents, and is as follows:—

Pay on 95 per cent of the silver, and  $\frac{1}{2}$  cent per unit for cobalt over 6 per cent. Payment will be deferred in ratio to percentage of arsenic contained in the ore as outlined hereunder. Cobalt settlement made on date of final silver settlement.

On ore containing from 2,000 to 3,000 ounces of silver per ton and carrying up to 10 per cent arsenic.

Ten-day sampling after delivery.

70 per cent of silver 30 days after sampling.

30 per cent of silver 60 days after sampling.

Over 10 per cent and up to 20 per cent arsenic—10-day sampling after delivery.

60 per cent silver 30 days after sampling.

30 per cent silver 60 days after sampling.

10 per cent silver 90 days after sampling.

Over 20 per cent arsenic—10 days for sampling.

50 per cent silver 30 days after sampling.

25 per cent silver 60 days after sampling.

25 per cent silver 90 days after sampling.

No penalty for arsenic or nickel. Smelter charges \$8 per ton. Company to have option of settling by bullion or cash at New York prices, on day of settlement.

#### *6. Swansea Smelting and Refining Co., Swansea, Ontario.*

A small amount of ore was shipped to this company during 1910, and it expects to be in a position to accept regular shipments during the current year.

#### *7. American Smelting and Refining Co., New York, U.S.A.*

This company receives most of the lower grades shipped from Cobalt, using it for fluxing purposes in its smelters in Denver and Omaha. The high grade ore it purchased was treated at Perth Amboy, N.J.

Tariff.—For ores assaying 1,000 ounces or over per ton.

Silver.—Pay for 95 per cent of the silver contents at New York quotation.

Treatment Charge.—\$8 per ton of 2,000 pounds, dry weight, plus  $\frac{1}{2}$  cent on each ounce of silver contained.

Arsenic.—An addition to the working charge will be made at the rate of 25 cents per dry ton for each per cent of arsenic in excess of five per cent. Sampling free.

Payment.—Thirty days after agreement of assays.

For ores under 1,000 ounces and over 60 ounces per ton.

Silver.—Payment for 95 per cent of the silver contents at the New York quotation.

Treatment Charge.—\$8 per ton of 2,000 pounds dry weight.

Arsenic.—An addition to the working charge will be made at the rate of 25 cents per dry ton for each per cent of arsenic in excess of 5 per cent.

Payment.—Cash settlement on agreement of assays.

*8. Balbach Smelting and Refining Co., Newark, U.S.A.*

The Nipissing Mining Company made a trial shipment of a few cars of ore to the Balbach Smelting and Refining Co. in 1910. The smelting company has no outstanding schedule for the purchase of cobalt ores, but is ready to purchase them when offered, providing they are low in arsenic.

*9. Beer, Sondheimer & Co., Frankfort-on-Main, Germany and New York, U.S.A.*

High grade silver ore is bought for this company by its New York agency, as follows:—

Pay for 95 per cent of the silver contents.

No smelting nor refining charge.

Ore to be delivered at Europe.

The ore is received at different European points, one of them, Antwerp.

*10. Pennsylvania Smelting Co., Pittsburg, Pa.—Works at Carnegie, Pa.*

The following is the schedule of purchase of silver cobalt ores offered by the Pennsylvania Smelting Co. in effect November 19, 1910:—

Schedule:—

For ores containing less than 200 ounces of silver to the ton, we will pay the New York silver price, less  $\frac{3}{4}$  cents per ounce for 95 per cent of the silver contents, less treatment charge of \$8 per ton.

For ores containing 200 to 400 ounces silver per ton, we will pay the New York silver price, less  $\frac{1}{2}$  cent per ounce for 95 per cent of the silver contents, less treatment charge of \$8 per ton.

For ore containing 400 to 2,000 ounces silver to the ton, we will pay the New York silver price, less  $\frac{1}{4}$  cent per ounce for 95 per cent of the silver contents, less a treatment charge of \$8 per ton.

For ores and coarse concentrates containing 2,000 ounces and upwards of silver per ton, we will pay the full New York silver price, for 95 per cent of the silver contents, no treatment charge.

For Vanner or Wilfley products, we will pay the New York silver price, less one cent per ounce for 94 per cent of the silver contents, less \$8 per ton treatment charge.

For jig concentrates containing from 400 to 2,000 ounces silver per ton, we will pay the New York silver price, less  $\frac{1}{2}$  cent per ounce for 95 per cent of the silver contents, less treatment charge of \$8 per ton.

Low grade 'ores' are expected to run less than 10 per cent arsenic.

All the above f.o.b. cars our works, Carnegie, Pa., P.C.C. and St. Louis railway.

Silver price to be the average of the next 20 business days after date of arrival of material at our works.

Settlement in full 30 days after date arrival material our works.

No payment for cobalt.

No charge for sampling at our works.

The above proposition is contract basis, as previously stated. Our regular schedule for chance shippers on low grade ore provides for a reduction of 1 cent per ounce from the silver price, paying for 95 per cent of the silver contents, less a treatment charge of \$8 per ton, and in case of Wilfley and Vanner, a deduction of 1 cent per ounce from the silver price, paying for 94 per cent of the silver contents, less a treatment charge of \$8 per ton. In case of ores, a penalty on arsenic of 25 cents per ton for each per cent in excess of 10 per cent.

Settlement assays to be the average of our results and shippers or shippers' representatives, if within splitting limits, otherwise reserve sample to be sent to umpire.

Splitting limits on ores of less than 150 ounces per ton to be  $1\frac{1}{2}$  ounces, on ores of 150 ounces and less than 500 ounces, 1 per cent of contents, on ores of more than 500 ounces 8-10ths of 1 per cent of contents.

#### *11. Quirk, Barton & Company, London, England.*

A contract is now running between the above smelting company and the Nipissing mine at Cobalt. This contract is of a private nature, and no general schedule has been issued, as the present contract fills the smelter's capacity for such ore. This is the only company now paying anything for the cobalt contents of the ore.

#### *12. United States Metals Refining Company, New York—Works at Chrome, N.J., U.S.A.*

The silver ores from Cobalt that are being purchased by this company are comparatively low grade, the richest containing 400 ounces silver per ton. No regular schedule is published, but the prices vary with the character of the ore purchased.

A number of the shipping companies at Cobalt have published, in annual reports, some details of their operations, from which the following extracts have been taken:—

#### *Buffalo Mines, Limited, Year Ending April 30, 1911.*

*Shipments.*—During the year 45 cars of ore were shipped containing 1079 tons of concentrates from the mill, and  $126\frac{1}{2}$  tons of high grade ore direct from the mine, or a total of  $1,205\frac{1}{2}$  tons of ore and concentrates shipped. There were also several small sales of native silver.



The returns for these shipments and sales amounted to 1,392,700 ounces, of which approximately 279,852 ounces were contained in the ore and 1,112,848 ounces in concentrates, or an average of 2,221 ounces per ton in the ore and an average of 1,031 ounces per ton in the concentrates.

In addition to this there were shipped 9,170 pounds of bullion, the smelter returns from which amounted to 114,419 ounces.

There were also on hand on April 30th, ready for shipment, 11,054 pounds of jig concentrates, containing 11,772 ounces, also 27,435 pounds of table concentrates, containing 11,276 ounces, and 837 pounds bullion containing 10,815 ounces, or a total of 33,863 ounces on hand.

*Production.*—Returns from smelter for ore and bullion shipped, and silver in ore and bullion on hand make a total production for the year of 1,540,782 ounces.

*Plant.*—The additions to milling plant in the past year consisted of additions to table slime plant for removing the fine mineral matter from slimes for cyanide treatment.

In the cyanide end the additions which are now in course of construction will double the capacity of this part of the plant bringing the tonnage up to about 100 to 115 tons per day. This will take care of all sands and slimes over 6 ounces. Delays in the non-arrival of machinery in contracted time have caused delay in completion of this part of the plant of some four or five months.

*Coniagas Mines, Limited, Year Ending October 31, 1910.*

During the past year your mine has been operated continuously excepting holidays, with an average force of 133 men.

The capacity of the concentrating mill has been doubled by the addition of thirty stamps, making a total of sixty stamps of 1,250 pounds each, crushing 160 to 170 tons of ore per day. The entire plant is now operated by electric power, purchased from the producing companies as is also the compressed air for the mine. These extensions and improvements have resulted in a very material saving on the cost of mining and concentrating per ton.

The total cost of producing one ounce of silver during the year was 13.285 cents, as compared with 15.219 cents during the previous year.

The Coniagas Mines, Limited, owns the issued capital stock of the Coniagas Reduction Company, Limited, except six shares, issued to the directors to qualify, and they also own the controlling interest in the Redington Rock Drill Company, incorporated under a Dominion charter with a capital of \$100,000 in 1,000 shares of \$100 each.



*Crown Reserve Mining Company, Limited, year ending December 31, 1910.*

### Shipments.

#### Total Production.

Total Shipments 1910.	Weight (Lbs.)	Ozs. Silver.	Gross Value.	Freight and Treatment.	Net Value.
			\$	\$	\$
High grade.....	1,637,905	2,958,379	1,591,628·18	86,639·77	1,504,988·41
Low grade.....	3,860,800	199,776	118,830·09	36,048·29	82,781·80
Bullion, 98,335 ozs.....	6,749	90,041	47,366·00	1,419·55	45,946·45
Total.....	5,505,454	3,248,196	1,757,824·27	124,107·61	1,633,716·66

#### Average Value of Ore.

	Ounces per ton.	Value per ton.
		\$
High grade.....	3,611	1,953·55
Low grade.....	103½	55·99
Average.....	1,148·2	621·18
Bullion.....	913·7 fine.	

#### Cost of Silver.

	Total Cost.	Cost per ounce.
Smelter Charges, Freight, Treatment and Marketing.....	\$125,883·06	3·89
Head Office Expenses, Depreciation and Insurance.....	48,959·16	1·52
Mining Development, Ore Handling and all other expenses.....	214,858·26	6·56
	\$389,700·48	11·97

Average price received for silver..... 54·1 cents per ounce.  
 Total cost of silver..... 11·97 " " "

*Kerr Lake Mining Company, Year Ending August 31, 1910.*

The production for the year amounted to 3,046,295 ounces. Of this 2,451,384 ounces were produced from the high grade ore (average contents per ton 3,775 ounces) and 594,911 ounces from second grade ore and screenings.

The costs of production per ounce are as follows:—

Mining cost.....	7·54 cents
Shipment and treatment charges.....	2·29 "
Metal deductions.....	2·71 "
Administration and general.....	0·73 "
Total.....	13·27 cents

*La Rose Consolidated Mines Company, May 31, 1910, to December 31, 1910.*

Class.	Dry Tons.	Net Value. per ton.	Gross Ozs. Silver.	Net Value.	Per cent of total Net Value.
		\$		\$	
Nuggets and Bullion.....	5,620	11,744·05	126,761·11	66,001·57	6·34
Silver-cobalt-nickel ore.....	901,897	801·41	1,444,259·93	722,791·09	69·44
Low grade siliceous ore.....	913,701	64·31	146,565·04	58,759·26	5·64
Concentrates.....	559,391	345·71	400,988·17	193,882·06	18·58
Total.....	2,380,609	437·26	2,118,574·25	1,040,933·98	100·00

### Average Assay of Shipments.

	Ozs. Silver. per ton.	Per cent Cobalt.	Per cent Nickel.
Nuggets and Bullion.....	22,565·36		
Silver-cobalt-nickel ore.....	1,601·36	9·64	5·18
Low grade siliceous ore.....	160·41		
Concentrates.....	716·83		
Average of Total.....	889·93		

### Summary of Shipments, June 1, 1910, to December 31, 1910.

Dry tons shipped .....	2,380·609
Gross ounces silver contained .....	2,118,574·25
Gross silver value .....	\$1,143,068·32
Average price received per ounce—cents .....	53·955
Received from sales of cobalt.....	\$ 4,208·04
Gross silver value plus cobalt paid for.....	1,747,276·36
Smelter deduction, freight, and treatment.....	106,342·38
Net value received from ore sales.....	1,040,933·98

### Cost of Producing Silver.

	Total.	Per Ton Shipping Ore.	Per Ozs. Silver.
	\$	\$	\$
Mine operation.....	294,355·73	117·70	·1146
Concentration.....	60,704·88	24·27	·0236
Depreciation.....	10,929·28	4·37	·0043
Marketing ore.....	131,143·48	52·44	·0510
Corporation and travelling expenses .....	1,173·91	·47	·0005
	498,307·28	199·25	·1940
Operation University mine .....	540·30	·22	·0002
	498,847·58	199·47	·1942
Less rents.....	7,727·98	3·09	·0031
Total cost of production.....	491,119·60	196·38	·1911

*Nipissing Mines Company, year ending December 31, 1910.***Shipments in 1910.**

	Dry Tons.	Net Value Per Ton.	Gross Ozs. Silver.	Net Value.	Per Cent of Total Value.
		\$		\$	
High grade ore .....	1,531·792	1,317·51	3,999,580·48	2,018,152·21	73·6
Low grade siliceous ores.	4,834·331	88·34	1,008,357·79	427,069·68	15·6
Concentrates .....	319·12	456·90	296,490·55	145,805·27	5·3
Nuggets .....	13·686	11,054·25	293,349·79	151,294·07	5·5
Total .....	6,698·93	409·37	5,597,778·61	2,742,321·23	100·0

**Average Assay of Shipments.**

	Ozs. Silver Per Ton.	Cobalt Per Cent.	Nickel Per cent.
High grade ore .....	2,611·04	9·35	6·72
Low grade siliceous ore .....	208·58		
Concentrates .....	929·08	6·46	2·68
Nuggets .....	21,433·51		
Average of Total .....	835·62		

**Summary of Shipments, 1910.**

Dry tons shipped .....	6,698·93
Gross ounces silver contained.....	5,597,778·61
Gross silver value .....	\$2,991,891·09
Average price received per ounce—cents.....	53·447
Cobalt paid for—pounds .....	167,532·
Received from sales of cobalt .....	\$16,109·89
Gross silver value plus cobalt paid for... ..	\$3,008,000·98
Smelter deduction, freight, and treatment .....	265,679·75
Net value received from ore sales.....	\$2,742,321·23

**Cost of Producing Silver.\***

		Per Ton Ore.	Per Oz. Silver.
	\$	\$	\$
Mine operation.....	492,224·05	73·28	·0887
Concentration .....	45,872·95	6·83	·0083
Depreciation .....	32,325·22	4·81	·0058
Marketing ore.....	279,169·61	41·56	·0503
Corporation, New York Office and travelling expenses. ....	20,057·71	2·98	·0036
	869,649·54	129·46	·1567
Less miscellaneous income, rent, and interest.....	52,668·85	7·84	·0095
	816,980·69	121·62	·1472

\*Based on production of 6,717·26 tons containing 5,548,651·91 ozs.

*McKinley-Darragh-Savage Mines of Cobalt, Limited, Calendar Year, 1910.*

The silver recovered was distributed in the following classes of products:—

	Product Tons.	Silver Ounces.	Per Cent. of Total.	Average Ounces per Ton.
McKinley-Darragh—				
Nuggets .....	835	12,871	6	15,414·4
No 1 Ore .....	302·912	671,168	30·3	2,215·1
Jig Concentrates .....	386·829	741,859	33·4	1,917·4
Sand Concentrates .....	725·567	589,062	26·1	811·7
Slime Concentrates .....	669·825	179,639	8·1	268·1
Miscellaneous .....	124·378	32,167	1·5	259·4
Totals .....	2,210·346	2,226,766	100·	1,000·8
Savage Mine—				
Nuggets .....	708	15,170	3·67	21,426·
No 1 Ore .....	136·957	303,828	73·61	2,251·7
Jig Concentrates .....	58·734	81,421	19·73	1,890·0
Sand Concentrates .....	20·662	12,356	2·99	596·9
Totals .....	217·061	412,775	100·	1,901·6

*Timiskaming Mining Company, Limited.*

**Summary of Ore Produced, Eleven Months—February 1 to December 31, 1910.**

Grade.	Gross weight at mine tons.	Net dry weight tons.	Average assay ozs. per ton.	Total ounces.	Price per ounce.	Gross value.
					\$	\$
First .....	366·219	359·402	3,698·85	1,329,368·82	542	721,655·40
Nuggets on hand .....	520	520	13,472·69	7,005·80	.....	3,809·39
Second .....	16·333	16·128	212·67	3,430·00	523	1,796·34
First concentrates .....	324·934	300·462	1,570·00	471,735·50	543	256,206·46
First concentrates on hand ..	1·500	1·317	888·00	1,169·14	.....	631·29
Second concentrates .....	379·332	351·310	169·20	59,430·52	534	31,763·22
Mill nuggets on hand .....	071	071	8,000·00	568·00	.....	308·85
Total .....	1,088·909	1,029·210	1,819·60	1,872,707·78	541	1,016,171·08
Cobalt paid for .....						356·85
Underestimate last year .....						1,159·72
Total production .....						1,017,687·65

**Production Cost, Mine and Mill—Total Production, 1,872,707 ozs. Cost of Production, 16·4 cents per oz.**

Class of work.	Cost.	Total cost per oz.
	\$	\$
Mining, hoisting and development. . . . .	136,188·83	·073
Ore sorting and crushing. . . . .	13,110·02	·007
Ore dump, labour. . . . .	1,983·00	·001
Transport to mill. . . . .	2,200·19	·001
Milling. . . . .	46,629·84	·025
Smelting cost. . . . .	67,020·83	·036
General expenses. . . . .	40,938·30	·021
Total. . . . .	308,071·01	·164

**British Columbia.**

The chief sources of the silver production in this province are the silver-lead ores of the East and West Kootenay, supplemented by the silver contained in the gold-copper-silver ores of the Rossland, Boundary and Coast districts. The production in 1910, based on smelter recoveries, was 2,407,887 ounces, valued at \$1,287,883.

As usual, the St. Eugène was the premier silver producer, followed among the silver-lead mines by the Richmond-Eureka, Sullivan, Eastmont, Standard and Silver Cup, in the order named.

The Granby mines at Phoenix, on account of their large tonnage of copper ores low in silver come second as silver producers, with the others above mentioned maintaining their relative positions.

A feature of the year is the return to the ranks of the heavy shippers of the Sullivan and Standard mines, both of which have in past years ranked among the largest producers in British Columbia. Of the total silver produced in the province, 78·4 per cent was recovered from the silver-lead-zinc ores of the East and West Kootenay mining districts.

The following table is taken from the annual report of the Minister of Mines for British Columbia, 1910:—



## SILVER.—TABLE 3.

## Production in British Columbia by Districts, 1906-1910.\*

	1906.	1907.	1908.	1909.	1910.
	Ounces.	Ounces.	Ounces.	Ounces.	Ounces.
Cassiar.....	26	2,291	14,169	4,569	1,454
Kootenay East—					
Fort Steele division.....	1,049,536	821,367	641,855	580,240	501,475
Other divisions.....	22,174	3,955	3,384	825	243
Kootenay West—					
Ainsworth division.....	165,915	301,322	314,142	352,555	233,010
Nelson.....	211,122	236,837	25,067	75,908	45,787
Slocan.....	571,613	590,998	848,595	738,175	964,634
Trail Creek.....	126,174	126,661	129,558	80,026	87,833
Other divisions.....	79,262	122,232	173,675	169,435	107,752
Yale—					
Boundary.....	671,661	469,206	451,323	492,333	460,945
Yale.....	1,034	223	23	.....	3
Coast and other districts.....	91,745	70,356	29,598	38,676	47,104
Totals.....	2,990,262	2,745,448	2,631,389	2,532,742	2,450,241

\* From the Minister of Mines Reports, British Columbia.

## Yukon.

The figures of silver production of the Yukon, given in Table 2, represent the silver alloyed with the placer gold, together with a small amount from the lode mines of the district. On an average, about one ounce of silver is contained in each five ounces of crude bullion from the alluvial workings. In 1908, about 41,000 ounces were credited to the placers, and 22,000 to the concentrates shipped from the Windy Arm district. In 1909, the production was 45,000 ounces of silver, all from the placer mines. In 1910, the placer production was 50,000 ounces, valued at \$26,743, and the lode production 37,418 ounces, valued at \$20,013, or a total of 87,418 fine ounces valued at \$46,756.

## Exports.

The following table shows the statistics of silver contained in ore, matte, or other form exported from Canada since 1886, as compiled from the reports of Trade and Navigation published by the Customs Department. The exports during 1910 were 30,699,770 ounces, valued at \$15,649,537, as against exports of 31,126,504 ounces, valued at \$15,719,909, in 1909.

## SILVER.—TABLE 4

## Exports of Silver in Ore, Matte, etc.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1886.....	25,957	1895.....	994,354	1904.....	1,904,394
1887.....	206,284	1896.....	2,271,959	1905.....	2,777,218
1888.....	219,008	1897.....	3,576,391	1906.....	5,686,444
1889.....	212,163	1898.....	2,902,277	1907.....	9,941,849
1890.....	204,142	1899.....	1,623,905	1908.....	12,403,482
1891.....	225,312	1900.....	2,341,872	1909.....	15,719,909
1892.....	56,688	1901.....	2,026,727	1910.....	15,649,537
1893.....	213,696	1902.....	1,820,058		
1894.....	359,731	1903.....	1,989,474		

## ZINC.

The production of zinc ore in Canada in 1910, as obtained by direct returns from the producers, was 5,063 tons valued at \$120,003, the greater part being from British Columbia. The zinc content of these shipments was returned as 4,361,712 pounds, which if valued at the average New York price of spelter during the year would be worth \$240,766.

The ore shipped from British Columbia contains also a varying silver content, for which payment is made by the smelters and without which on account of the import duty to the United States and the long rail haul, it would not pay to ship. The Richardson, or Long Lake mine in Olden township, Frontenac county, Ontario, produced 576 tons of ore and concentrates, which were shipped to Europe.

As with lead, the year's output was seriously affected by fires in the Slocan. The Whitewater mill was destroyed by fire, and the destruction of bridges and trestles of the Kaslo and Slocan railway in July, removed transportation facilities from several of the mines.

The lease by the Van Roi Mining Co., Ltd., of the Wakefield mill, expired in August, and production there was consequently suspended. The Ruth produced some zinc concentrates, but did not ship.

The British Columbia zinc ore is exported for treatment to Kansas and Oklahoma smelters, and since the smelters demand over 30 per cent zinc, the maximum rate of the United States customs tariff affects Canadian ores.

The present schedule of the tariff on zinc ores is as follows:—

Ores containing less than 10 per cent, free of duty.

Ores containing 10 per cent or more, and less than 20 per cent,  $\frac{1}{2}$  cent per pound.

Ores containing 20 per cent or more, and less than 25 per cent,  $\frac{1}{2}$  cent per pound.

Ores containing 25 per cent or more, 1 cent per pound.

All rates being based on the metallic contents of the zinc.

The United States smelters usually pay on a basis of 45 per cent zinc content. The base price varies with the price of spelter at St. Louis, and a stated amount is added or deducted for every unit of zinc in excess of or less than the base. The silver is settled for at the New York price after making deductions for losses in treatment. Limits are frequently set which lead or iron contents may not exceed.

A typical example may be given. A certain mine was paid \$28.50 per short ton for zinc concentrates carrying 45 per cent zinc, when spelter was quoted at 5 cents per pound at St. Louis. For every unit above or below 45 per cent zinc 85 cents was added or deducted. For every increase or decrease of one per cent pound in the price of spelter at St. Louis, an increase or de-

crease was allowed of \$7 per ton of 2,000 pounds, and proportionately for fractions thereof. In the case of the silver contents, six ounces per ton were deducted and 75 per cent of the remainder paid for at the New York price.

The sellers paid freight, customs duty, and collection charges.

The imports of zinc taken as an index of consumption, show a fairly steady increase. The total imports of zinc in blocks and pigs and spelter were, in 1880, some 744 tons. In 1889 they had risen to 1,427 tons, and remained fairly stationary till about 1899, in which year the imports were 1,213 tons. In the fiscal year ending March, 1909, they had risen to 4,610 tons, and for the calendar year, 1910, they totalled 7,037 tons, in addition to which there were 4,248 tons of zinc white, and zinc manufactures, to the value of \$21,829.

Statistics of the production and imports of zinc and the average monthly prices of spelter on the New York and London markets for two years are given in the accompanying tables:—

The following is a list of the zinc producers in 1910:—

Mine.	Locality.	Company operating
Whitewater.....	Whitewater, B.C.....	S. S. Fowler and associates.
Whitewater Deep.....	" ".....	" " " " " "
Lucky Jim.....	Kaslo " ".....	Lucky Jim Zinc Mines, Ltd.
Vancouver Group.....	Silverton " ".....	Van Roi Mining Co., Ltd.
Ruth *.....	Sandon " ".....	Ruth Mines, Ltd.
Long Lake.....	Olden Twp, Frontenac Co., Ont.	Jas. Richardson & Sons.

\* Produced zinc concentrates but did not ship.

ZINC.—TABLE 1.

### Annual Production of Zinc.

Calendar Year.	Zinc Ore Shipped.		Metallic Zinc in Ore Shipped.	
	Tons.	Spot Value.	Pounds.	Final Value.
		\$		\$
1898.....	1,162	11,000	788,000	36,011
1899.....	865	18,165	814,000	46,805
1900.....	261	4,810	212,000	9,342
1901.....				
1902.....	158	1,659	142,200	6,882
1903.....	1,000	10,500	900,000	48,660
1904.....	597	8,700	477,568	24,256
1905.....	9,413	139,200	*	*
1906.....	1,154	23,800	*	*
1907.....	1,573	49,100	*	*
1908.....	452	3,215	*	*
1909 (a).....	18,371	242,699	16,468,204	906,245
1910.....	5,063	120,003	4,361,712	240,766

\* Figures not available.

(a) Includes 7,424 tons shipped late in 1908.

## ZINC.—TABLE 2.

## Imports of Zinc in Blocks, Pigs, and Sheets.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
1880.....	13,805	\$67,881	1891.....	17,984	105,023	1902.....	34,871	141,560
1881.....	20,920	94,015	1892.....	21,881	127,302	1903.....	26,646	142,827
1882.....	15,021	76,631	1893.....	26,446	124,360	1904.....	25,553	138,057
1883.....	22,765	94,799	1894.....	20,774	90,680	1905.....	25,141	141,514
1884.....	18,945	77,373	1895.....	15,061	63,373	1906.....	24,462	158,438
1885.....	20,954	70,598	1896.....	20,223	80,784	1907 (9 mos.)..	18,427	126,221
1886.....	23,146	85,599	1897.....	11,946	57,754	1908.....	30,362	191,081
1887.....	26,142	98,557	1898.....	35,148	112,785	1909.....	26,222	141,066
1888.....	16,407	65,827	1899.....	18,785	107,477	1910.....	35,040	201,777
1889.....	19,782	83,925	1900.....	28,748	156,167			
1890.....	18,236	92,530	1901.....	20,527	103,457			

## ZINC.—TABLE 3.

## Imports of Spelter.\*

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
1880.....	1,073	5,301	1891.....	6,249	31,459	1902.....	18,356	80,757
1881.....	2,904	12,276	1892.....	13,909	62,550	1903.....	23,159	110,817
1882.....	1,654	7,779	1893.....	10,721	49,822	1904.....	33,952	164,751
1883.....	1,274	5,196	1894.....	8,423	35,615	1905.....	37,941	206,244
1884.....	2,239	10,417	1895.....	9,249	30,245	1906.....	50,137	290,686
1885.....	3,325	10,875	1896.....	10,897	40,548	1907 (9 mos.)..	42,465	269,044
1886.....	5,432	18,238	1897.....	8,342	32,826	1908.....	65,593	314,369
1887.....	6,908	25,007	1898.....	2,794	13,561	1909.....	55,981	310,688
1888.....	7,772	29,762	1899.....	5,450	29,687	1910.....	132,001	658,285
1889.....	8,750	37,403	1900.....	5,836	29,416			
1890.....	14,570	71,122	1901.....	14,621	58,283			

\* Spelter in blocks and pigs.

## ZINC.—TABLE 4.

## Imports of Zinc, Manufactures of.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1880.....	\$ 8,327	1891.....	7,178	1902.....	6,683
1881.....	20,178	1892.....	7,563	1903.....	9,754
1882.....	15,526	1893.....	7,464	1904.....	12,682
1883.....	22,599	1894.....	6,193	1905.....	11,912
1884.....	11,952	1895.....	5,581	1906.....	12,917
1885.....	9,459	1896.....	6,290	1907 (9 months) ..	12,556
1886.....	7,345	1897.....	5,145	1908.....	19,240
1887.....	6,561	1898.....	10,503	1909.....	15,621
1888.....	7,402	1899.....	14,661	1910.....	15,495
1889.....	7,233	1900.....	11,475		
1890.....	6,472	1901.....	6,882		

1910	{	Zinc seamless drawn tubing.....	Duty Free	
		" manufactures of, N.O.P.....	25%	\$ 15,495
Total.....				\$ 15,495



## World's Production of Spelter in Short Tons.\*

Country.	1904.	1905.	1906.	1907.	1908.	1909.
Australia .....			1·131	1·098	1·198	.....
Austria and Italy ..	10·192	10·315	11·883	12·522	14·063	13·931
Belgium .....	154·314	160·496	168·067	170·307	181·851	184·194
France and Spain..	54·107	55·524	59·293	61·438	61·512	61·859
Germany—						
Rhine District...	72·083	74·127	75·729	77·459	80·670	82·863
Silesia .....	138·538	143·243	150·282	152·611	158·328	159·731
Great Britain .....	50·949	56·140	57·971	61·286	60·029	65·422
Holland .....	14·442	15·176	16·150	16·526	19·017	21·548
Poland .....	11·693	8·422	10·595	10·735	9·740	8·758
United States ...	186·704	208·849	224·770	249·860	210·424	255·760
Total .....	693·022	727·292	775·871	813·842	796·832	854·066

\* Mineral Resources of the United States 1909.

## World's Consumption of Spelter in Short Tons.\*

Country.	1907.	1908.	1909.	Country.	1907.	1908.	1909.
Austria-Hungary.	34·171	35·925	36·155	Italy .....	7·496	9·257	9·039
Belgium .....	60·627	74·936	68·343	Russia .....	19·290	19·946	20·282
France ...	76·720	85·956	73·744	Spain .....	5·180	5·290	4·850
Germany .....	192·792	198·580	207·232	United States...	13·228	11·020	6·614
Great Britain .....	154·653	152·627	171·408	Other Countries..	226·969	214·167	270·730
Holland .....	4·189	4·188	4·409				
				Totals .....	795·315	811·892	872·806

\* Mineral Resources of the United States, 1909.

## Average Price of Spelter in Cents per Pound at New York.\*

Month.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
January ....	4·13	4·27	4·865	4·863	6·190	6·487	6·732	4·513	5·141	6·101
February ....	4·01	4·15	5·043	4·916	6·139	6·075	6·814	4·785	4·889	5·569
March .....	3·91	4·28	5·349	5·057	6·067	6·209	6·837	4·665	4·757	5·637
April .....	3·98	4·37	5·550	5·219	5·817	6·087	6·687	4·645	4·965	5·439
May .....	4·04	4·47	5·639	5·031	5·434	5·997	6·441	4·608	5·124	5·191
June .....	3·99	4·96	5·697	4·760	5·190	6·096	6·419	4·543	5·402	5·128
July .....	3·95	5·27	5·662	4·873	5·396	6·006	6·072	4·485	5·402	5·152
August .....	3·99	5·44	5·725	4·866	5·706	6·027	5·701	4·702	5·729	5·279
September .....	4·08	5·49	5·686	5·046	5·887	6·216	5·236	4·769	5·796	5·614
October .....	4·23	5·38	5·510	5·181	6·087	6·222	5·430	4·801	6·199	5·628
November .....	4·29	5·18	5·038	5·513	6·145	6·375	4·925	5·059	6·381	5·976
December .....	4·31	4·78	4·731	5·872	6·522	6·593	4·254	5·137	6·249	5·624
Year .....	4·07	4·84	5·40	5·100	5·822	6·198	5·962	4·726	5·503	5·520

\* From the Statistical publication of the Metallgesellschaft, etc., of Frankfort-on-the-Main, Germany.

## Average Prices of Spelter, Ordinary Brands, in London.\*

Month.	1901.	1902.	1903.	1904.	1905.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
January .....	18 13 3	16 13 ..	20 0 8	21 11 2	24 19 9
February .....	17 13 7	17 14 2	20 15 4	21 16 5	24 10 6
March .....	16 11 4	17 13 4	22 18 2	21 19 6	23 13 6
April .....	16 11 4	17 17 ..	22 8 7	22 5 1	23 14 3
May .....	17 6 3	18 9 ..	21 2 4	22 2 10	23 11 8
June .....	17 5 9	18 11 8	20 8 2	21 14 6	23 16 8
July .....	16 11 4	18 19 11	20 8 5	22 2 9	23 19 6
August .....	16 15 7	18 16 8	20 9 5	22 7 6	24 14 6
September .....	16 16 8	19 4 7	20 17 7	22 11 5	26 8 3
October .....	16 18 1	19 5 4	20 9 4	23 1 7	28 1 7
November .....	16 17 5	19 11 8	20 14 7	24 12 9	28 5 11
December .....	16 11 8	19 15 6	20 19 10	24 17 1	28 14 11
Year .....	17 0 7	18 0 11	20 19 5	22 11 10	25 7 7

Month.	1906.	1907.	1908.	1909.	1910.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
January .....	28 8 2	27 7 1	20 6 3	21 6 3	23 4 2
February .....	26 2 4	26 1 5	21 0 7	21 8 9	23 3 1
March .....	24 15 3	26 4 8	21 1 5	21 8 8	23 0 7
April .....	25 19 3	25 17 5	21 6 1	21 10 1	22 9 10
May .....	27 0 2	25 14 2	20 2 10	21 19 ..	22 1 1 $\frac{1}{2}$
June .....	27 9 9	24 10 2	19 2 2	21 19 11	22 3 2
July .....	26 15 11	23 18 11	18 14 1	21 18 9	22 5 5
August .....	27 0 5	22 1 7	19 6 9	22 0 3	22 14 0
September .....	27 12 5	21 0 11	19 10 2	22 17 1	23 2 7
October .....	27 18 10	21 12 11	19 15 1	22 3 4	23 16 6
November .....	27 15 1	21 8 4	20 17 1	23 2 1	24 1 9
December .....	27 19 3	20 3 3	20 19 2	23 1 3	24 0 5
Year .....	27 1 5	23 16 9	20 3 5	22 3 ..	23 1 0

\* From the annual publication of the Metallgesellschaft, etc., of Frankfort-on-the-Main, Germany.

## MISCELLANEOUS METALLIC MINERALS.

### ALUMINIUM.

No commercial ores of aluminium have as yet been found in Canada. Aluminium is, however, made in extensive works at Shawenegan Falls, Que., from bauxite ores imported from France, Germany and the United States, by the Northern Aluminium Company. A wire mill for the manufacture of aluminium wire and cables is also operated by the same firm.

There being but one firm engaged in the manufacture of aluminium, we are precluded from publishing statistics of production.

Imports of alumina, which probably includes bauxite, and exports of aluminium, are, however, published in the reports of the Department of Customs.

During the twelve months ending December 31, 1910, the imports of alumina were 19,464,400 pounds, or 9,732 tons, while the exports of aluminium in ingots, bars, &c., during the same period were 7,722,400 pounds, or 3,861 tons, besides manufactures of aluminium, valued at \$3,741. The imported alumina was valued at 2.07 cents per pound, and the exported aluminium at 15.02 cents.

The imports of alumina and exports of aluminium during the past seven years are shown in tabular form as follows:—

#### Annual Imports of 'Alumina' and Exports of Aluminium.

Calendar Year.	Imports of Alumina.		Exports of Aluminium.		
			Ingots, bars, &c.		Manufactures.
	Lbs.	Value. \$	Lbs.	Value. \$	Value. \$
1905. ....	5,360,800	138,765	2,535,386	508,219	1,588
1906. ....	8,975,400	239,136	4,521,486	899,113	2,244
1907. ....	12,705,300	268,502	5,478,203	1,109,353	1,499
1908. ....	1,485,500	29,752	1,713,800	399,785	1,727
1909. ....	11,794,100	234,544	6,134,500	918,195	3,453
1910. ....	19,464,400	403,283	7,722,400	1,160,242	3,741

Prices.—The price of aluminium (No. 1 ingots), in New York, during 1910, varied between the limits of 20 and 24 cents per pound, while practically the same prices ruled during 1909. In 1908, the price fell from 38 cents in the early part of the year to 22 cents in December.

In Europe, prices for aluminium for several years have been considerably lower than in the United States.

In 1908, the prices per pound at works is reported as having ranged from 14 cents to 21½ cents, in 1909 from 13½ cents to 16 cents, and in 1910, from 14 cents to 17¼ cents.

## ANTIMONY.

The total production of antimony in 1910, as reported to this Branch, consisted of 364 tons of antimony concentrates, valued at \$13,906, shipped from West Gore, Nova Scotia. In 1909, in addition to the shipment of 35 tons of concentrates, there were produced about 61,200 pounds of antimony metal chiefly at the works of the Canadian Antimony Company, Limited, at Lake George, New Brunswick, a small recovery being also reported from the Consolidated Mining and Smelting Company's refinery at Trail, B.C.

In 1908, customs returns showed an export of 148 tons of antimony ore valued at \$5,443.

In 1907 the production was 2,016 tons of antimony ore shipped, valued at \$65,000, and 63,850 pounds of refined antimony, valued at \$5,108.

In British Columbia, some of the lead ores contain a small percentage of antimony—about one-third of one per cent—and some refined antimony was recovered at Trail in 1907 and 1909, the recovery being somewhat irregular.

The auriferous antimony property at West Gore, Hants county, Nova Scotia, formerly operated by the Dominion Antimony Company, Limited, was taken over in July, 1909, by the West Gore Antimony Company, under the management of A. Gordon Plews.

During 1910, no ore except a small amount won from development work was raised. The ore treated consisted of second-class material from the dumps, from which the best material had already been extracted by hand-picking.

Considerable alterations have been made to the 100-ton concentrating mill since the present owners came into possession. New machinery, consisting of one five foot Huntington mill, one Wilfley table, three Frue vanners and one Lükrig vanner, have been added, together with an extension of the building to accommodate part of the new machinery.

A dam for the recovery and clarification of the dressing water has been built, and numerous alterations to the flow sheet made, as experience showed necessary.

Shipments are made to the St. Helen's Smelting Company, St. Helen's, England.

The mine and works of the Canadian Antimony Company, Ltd., at Lake George, New Brunswick, were not in operation during 1910.

## Annual Shipments of Antimony Ore.\*

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	665	31,490	1899 to 1904 .....	Nil.	Nil.
1887.....	584	10,860	1905 (a).....	527	.....
1888.....	345	3,696	1906 (a).....	782	.....
1889.....	55	1,100	1907*.....	2,016	65,000
1890.....	96 $\frac{1}{2}$	625	1908 (b).....	148	5,443
1891.....	10	60	1909*.....	35	1,575
1892 to 1897.....	Nil.	Nil.	1910.....	364	13,906
1898.....	1,344	20,000			

(a) As recorded by the Nova Scotia Department of Mines ; no value given.

(b) Exports.

\* In addition to the shipments shown in the table, refined antimony was produced in 1907 to the extent of 63,850 pounds valued at \$5,108, and in 1909, 61,207 pounds valued at \$4,285.

## Exports of Antimony Ores.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1880.....	40	1,948	1898.....	1,232	15,295
1881.....	34	3,308	1899.....	6 $\frac{3}{4}$	190
1882.....	323	11,673	1900.....	210	3,441
1883.....	165	4,200	1901.....	10	1,643
1884.....	483	17,875	1902.....	90	13,654
1885.....	758	36,250	1903.....	33	4,332
1886.....	665	31,490	1904.....	160	7,237
1887.....	229	9,720	1905.....	525	27,118
1888.....	352 $\frac{1}{2}$	6,894	1906.....	420	17,064
1889.....	30	695	1907.....	1,327	37,807
1890.....	38	1,000	1908.....	148	5,443
1891.....	3 $\frac{1}{2}$	60	1909.....	4	120
1892 to 1897.....	Nil.	Nil.	1910.....	239	14,095



## Imports of Antimony.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	42,247	5,903	1896.....	163,209	9,557
1881.....		7,060	1897.....	134,661	8,631
1882.....	183,597	15,044	1898.....	156,451	12,350
1883.....	105,346	10,355	1899.....	289,066	16,851
1884.....	445,600	15,564	1900.....	186,997	20,001
1885.....	82,012	8,182	1901.....	350,737	24,714
1886.....	89,787	6,951	1902.....	504,822	39,276
1887.....	87,827	7,122	1903.....	868,146	65,434
1888.....	120,125	12,242	1904.....	418,943	27,112
1889.....	119,034	11,206	1905.....	186,454	12,828
1890.....	117,066	17,439	1906.....	403,918	56,297
1891.....	114,084	17,483	1907 (9 mos).....	321,385	71,493
1892.....	180,308	17,680	1908.....	484,899	66,484
1893.....	181,823	14,771	1909.....	444,254	32,133
1894.....	139,571	12,249	1910.....	563,662	40,681
1895.....	79,707	6,131			
1910 { Antimony, or regulus of, not ground, pulverized or otherwise manufactured..... Antimony salts..... Total.....			Duty Free.		\$
			"	510,709	34,728
				52,953	5,953
				563,662	40,681

## COBALT.

Cobalt is an important constituent of the silver-cobalt-nickel-arsenides of Coleman and adjacent townships, more familiarly known as the Cobalt district, province of Ontario, and these ores are now said to be the principal source of the world's consumption of cobalt.

With respect to the greater part of the ore shipped in which silver is the chief constituent of value, most of the purchasing smelters make no allowance for the cobalt contents, and the mine owners therefore receive very little for the cobalt. The amount received by the producers of ore for its cobalt content was, in 1910, according to returns received by this department, \$51,986, as compared with \$94,609 in 1909, and \$113,423 in 1908.

At the end of 1910, with the exception of one private contract, payment for cobalt contents had ceased altogether.

The recovery of cobalt in Canada has so far been confined to the production of cobalt oxide and mixed cobalt and nickel oxides, by the Coniagas Reduction Company and the Deloro Mining and Reduction Company. During 1910, according to the report of the Ontario Bureau of Mines, the quantity of cobalt oxide shipped was 13,508 pounds, valued at \$9,630, and the quantity of mixed cobalt and nickel oxides shipped was 108,178 pounds, valued at \$18,769.

No information is available as to the quantities recovered from ores shipped to smelters outside of Canada.

The total quantity of metallic cobalt contained in the ores shipped from the mines of this district in 1910 is estimated by the same authority at 1,098 tons.<sup>1</sup>

It is also estimated that the total ore shipments from Cobalt during the past seven years have contained upwards of 5,000 tons of metallic cobalt.

The following table shows the ore shipments, estimated cobalt contents, and value received by the shippers for cobalt, as published by the Ontario Bureau of Mines:—

Year.	Ores shipped.	Estimated. total cobalt content.	Per cent.	Value received by shippers for cobalt
	Tons.	Tons.	%	\$
1904.....	158	16	10·1	19,960
1905.....	2,144	118	5·5	100,000
1906.....	5,335	321	6·0	80,704
1907.....	14,788	739	5·0	104,426
1908.....	25,624	1,224	4·7	111,118
1909.....	30,677	1,533	5·0	94,965
1910.....	34,282	1,098	3·2	54,699

<sup>1</sup> Annual Report Ontario Bureau of Mines, Vol. XX, p. 18.

The production of cobalt has so largely exceeded the demand as to cause a very great fall in the price.

The price of cobalt oxide (78.6 per cent Co.) in New York, during 1907, remained uniformly at \$2.50 per pound. In 1908, the price fell to \$1.45 in April, and \$1.40 in November. During the first three months of 1909, from \$1.45 to \$2.60 was quoted, after which the price fell to from \$1.10 to \$1.75, which held until December. In the latter part of December there was a further falling off to 80 or 85 cents per pound.

During 1910 the price remained fairly constant at from 80 to 85 cents per pound.

## MERCURY.

There has been no production of mercury since 1897. The small production reported in 1895 and 1897, was derived from the deposits at the western end of Kamloops lake, B.C. These deposits consist of quartz veins containing pockets of cinnabar. These veins are in a zone of decomposed volcanic rock of Tertiary age.

### Production of Mercury.

Calendar Year.	Flasks. (76½ lbs.)	Price per flask.	Value,
		\$	\$
1895.....	71	33 00	2,343
1896.....	58	33 44	1,940
1897.....	9	36 00	324

### Imports of Mercury.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
					\$			\$
1882.....	2,443	965	1892.....	30,936	15,038	1901.....	140,610	94,564
1883.....	7,410	2,991	1893.....	50,711	22,998	1902.....	97,283	56,615
1884.....	5,848	2,441	1894.....	36,914	14,483	1903.....	164,968	91,625
1885.....	14,490	4,781	1895.....	63,732	25,703	1904.....	151,107	80,658
1886.....	13,316	7,142	1896.....	77,869	32,343	1905.....	103,330	48,412
1887.....	18,409	10,618	1897.....	76,058	33,534	1906.....	150,364	69,505
1888.....	27,951	14,943	1898.....	59,759	36,425	1907 (9 mos)....	98,368	45,662
1889.....	22,931	11,844	1899.....	103,017	51,695	1908.....	178,411	76,549
1890.....	15,912	7,677	1900.....	85,342	51,987	1909.....	92,220	46,217
1891.....	29,775	20,223				1910 Duty free.	283,980	146,914

## MOLYBDENUM.

Although there are numerous occurrences of molybdenite in Canada of more or less undetermined value, there has been very little production of the mineral.

In 1902, about 6,500 pounds of molybdenum, valued at \$400, were reported as having been taken from a deposit in the township of Laxton, county of Victoria, by John Webber, of Toronto.

In 1903, Mr. A. W. Chisholm, of Kingston, reported the shipment to the United States and elsewhere of 85 tons of molybdenum ore, valued at \$1,275, culled from about 500 or 600 tons of rock taken from the east half of lot 5, concession XIV., Sheffield township, Addington county.

According to "The Mineral Industry," published in New York: "The market for molybdenum ores is very narrow. The price fluctuates widely, and is generally subject to special negotiations at each particular sale. American buyers require concentrates to contain 90 to 95 per cent molybdenite, for which they will pay \$400 to \$450 per ton. The principal purchasers in the United States are: Electrometallurgical Company of America, New York; Primos Chemical Company, Primos, Penn.; DeGolia & Atkins, San Francisco, Cal. In Germany, Friedrich Krupp, of Essen, is a large user of molybdenum."



## PLATINUM AND PALLADIUM.

Although no production of platinum or palladium is reported for 1910, it seems probable that some recovery of platinum may have been made from placer mining on the Tulameen river, B.C.

In former years the chief source of the platinum production in Canada has been the placer gravels of British Columbia, principally in the Similkameen district.

The nickel-copper ores of the Sudbury district also carry small quantities of the metals of the platinum group, and from 1902 to 1906 considerable quantities of these metals were recovered from accumulated residues resulting from the treatment of the mattes from Sudbury. This recovery, however, has apparently ceased.

The Tulameen district of British Columbia was visited in 1910 by Mr. Charles Camsell of the Geological Survey, who reports that "A few Chinese miners were again placer mining on a part of the bed of the Tulameen river between the mouths of Eagle and Champion creeks. This particular portion of the stream bed has been worked over a great many times since the first discovery of gold on it. Within the last twelve years it has been mined at least eight times, and the old cabins, gravel dumps, and abandoned machinery, show that it had already been worked over years before. Gold and platinum are obtained here in about equal proportions. The evidence suggests that the gold and platinum on the stream bed are replenished annually from some near-by source. What this source is, has not yet been determined. There are no prominent gravel deposits directly above this point, but it is significant that it lies immediately below a sheared and broken zone formed in the bed-rock, on the contact of pyroxenite with green schists. The method of working is to divert the water by wing dams to one side of the stream bed, and mine the other by sluicing. The amount of gold and platinum actually recovered was not ascertained, but it appears to have been satisfactory to the miners."

### Annual Production of Platinum.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1887.....	5,600	1894.....	950	1901.....	457
1888.....	6,000	1895.....	3,800	1902.....	46,502
1889.....	3,500	1896.....	750	1903.....	33,345
1890.....	4,500	1897.....	1,600	1904.....	10,872
1891.....	10,000	1898.....	1,500	1905.....	500
1892.....	3,500	1899.....	825	1906.....	*
1893.....	1,800	1900.....	Nil.		

\* See under Palladium.

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## Annual Production of Palladium.

	Ozs.	Value.
1902 Palladium.....	4,411	\$86,014
1903 ".....	3,177	61,952
1904 ".....	952	18,564
1905 Metals of the platinum group.....	1,562	28,116
1906 ".....	314	5,652
1907-1910.....	*Nil.	Nil.

\*Ontario Bureau of Mines Report, 1910.

## Imports of Platinum.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1883.....	113	1892.....	1,952	1901.....	20,263
1884.....	576	1893.....	14,082	1902.....	19,357
1885.....	792	1894.....	7,151	1903.....	21,251
1886.....	1,154	1895.....	3,937	1904.....	28,112
1887.....	1,422	1896.....	6,185	1905.....	61,719
1888.....	13,475	1897.....	9,031	1906.....	54,494
1889.....	3,167	1898.....	9,781	1907.....	113,485
1890.....	5,215	1899.....	9,671	1908.....	60,390
1891.....	4,055	1900.....	57,910	1909.....	45,534
.....	.....	.....	.....	1910*.....	84,435

\* Platinum wire and platinum in bars, strips, sheets or plates; platinum retorts, pans condensers, tubing and pipe, imported by manufacturers of sulphuric acid for use in their works; crucibles. Duty free.

## TIN.

Tin ores have not yet been found in sufficient quantities in Canada to be of economic importance.

The occurrence of tin ore has been reported from several localities, the most important, perhaps, being the recent discovery of cassiterite, near New Ross, Lunenburg county, Nova Scotia. This occurrence has not yet been found of economic value. It has been visited by several officers of the Geological Survey, and reports upon it may be found in the Summary Report of the Geological Survey Branch, of the Department of Mines, for 1907, pages 77, and 80 to 83, and in the report for 1908, page 154.

In further reference to the New Ross occurrences, Mr. Faribault, in his summary report for 1910, states that: "At New Ross, Lunenburg county, some distance east of the district surveyed last summer, two important veins, one bearing manganese and the other tin and copper, were opened last summer.

"A tin-bearing vein, also recently discovered by Ernest Turner, at Mill Road, four miles north of New Ross, has been prospected under the management of A. L. McCallum. It has been proved to a depth of 20 feet, and for a length of 250 feet, while the float has been traced half a mile towards the north. The vein is 24 inches wide, mostly made up of quartz, merging with granite at the sides, and carries at the middle a streak of rich ore from three to five inches wide. Several assays of the ore made by Mr. McCallum have given from 10 to 30 per cent tin, and 8 per cent copper, present in the form of cassiterite and chalcopyrite, with association of tungsten-bearing and zinc minerals."

The imports of tin and manufactures thereof into Canada are shown in the following table:—

## Imports of Tin and Tinware.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	281,880	1890. ....	1,289,756	1900.....	2,418,455
1881.....	413,924	1891.....	1,206,918	1901.....	2,339,109
1882.....	790,285	1892.....	1,594,205	1902.....	2,293,958
1883.....	1,274,150	1893.....	1,242,994	1903.....	2,712,186
1884.....	1,018,493	1894.....	1,310,389	1904.....	2,389,557
1885.....	1,060,883	1895.....	973,397	1905.....	2,791,757
1886.....	1,117,368	1896.....	1,237,684	1906.....	3,336,948
1887.....	1,187,312	1897.....	1,274,108	1907.....	2,719,813
1888.....	1,164,273	1898.....	1,550,851	1908.....	4,059,281
1889.....	1,243,794	1899.....	1,372,813	1909.....	2,985,361
				1910.....	3,822,443

	Duty Free.	Pounds.	\$
1910 { Tin crystals .....			2,825
Tin in blocks, pig and bars. ....	"	3,368,300	1,005,467
Tin plates and sheets .....	"	79,732,300	2,404,777
Tin foil.....	"	817,979	102,294
Tinware, plain, japanned or lithographed, and all manufactures of tin, N.E.S.....	25% Free.	.....	307,033
Tin strip waste.....		4,700	77
Total.....			3,822,443

## TUNGSTEN.

Reference was made in the report for 1908 to the discovery of scheelite in Halifax county, Nova Scotia. Mr. Faribault of the Geological Survey visited this deposit again in 1909, and a preliminary report thereon will be found in the Summary Report of the Geological Survey for 1909, page 228-234. During 1910 these deposits were being developed by the Scheelite Mines Company, who are reported to have obtained very satisfactory results. In his summary report for 1910, Mr. Faribault refers to a new discovery in Queens county, as follows: "A new discovery of tungsten ore, in the form of scheelite has been made by A. N. Prest, at Middlefield, Queens county, near the Fifteen-mile Brook gold mine, and prospecting was started last fall in order to trace the float to the parent vein."

The occurrence of wolframite has also been noted in association with molybdenite by Dr. Walker in New Brunswick, near the confluence of Burnt Hill brook and the S. W. Mirimichi. The property is being tested by Mr. Freeze of Doaktown, N.B., and Mr. Matthew Lodge of Moncton, who are interested therein.



## NON-METALLIC PRODUCTS.

### ABRASIVE MATERIALS.

The abrasives produced in Canada comprise corundum, the various sandstone abrasives, such as grindstones, pulpstones, whetstones, etc., and tripolite or infusorial earth.

#### CORUNDUM.

The total shipments of grain corundum from operator's mills in 1910 were 3,740,900 pounds, as compared with shipments in 1909 of 2,981,634 pounds. Corundum ores are mined in Canada by two companies, now amalgamated, in the counties of Renfrew and Hastings respectively, and both mills were in active operation during the past year. A total of 37,183 tons of rock was milled, from which 3,372,800 pounds of grain corundum were graded during 1910.

Detailed statistics of output and shipments during the past three years are as follows:—

	1908.	1909.	1910.
Rock treated .....	2,678 tons.	35,894 tons.	37,183
Grain corundum graded .....	212,150 lbs.	3,158,300 lbs.	3,372,800
Shipments—			
Grain corundum sold in Canada.....	198,600 "	258,500 "	211,460
" " sold in other countries....	1,980,190 "	2,723,134 "	3,529,440
Total sales .....	2,178,790 lbs.	2,981,634 lbs.	3,740,900

Corundum is found in Faraday, Dungannon, Monteagle, Carlow, Raglan, and adjacent townships, the operating mines being located in the last two. Mining operations have been in progress since 1900. In the earlier years of the industry, the amount of grain corundum graded averaged about 2 per cent of the rock treated. In more recent years, however, a much lower grade of rock has been milled, the recovery of corundum in 1910 averaging about 4.5 per cent, in 1909 averaging about 4.4 per cent, and in 1908 about 3.9 per cent of the rock treated.

The product finds a market in Canada, the United States, England, France, Germany and Belgium. Descriptions of mines and mills will be found in the Annual Report of the Ontario Bureau of Mines, and in Memoir No. 6, Geological Survey Publications.<sup>1</sup>

(<sup>1</sup>) The geology of the Haliburton and Bancroft areas, Province of Ontario, by Frank D. Adams and Alfred E. Barlow.

The Manufacturers Corundum Company, Limited, Craigmont, Ont., having leased the mine and mill of the Ashfield Emery and Corundum Company, Limited, Burgess Mines, Ont., is at present the only active operator.

Statistics of shipments since 1900, are shown as follows:—

Grain Corundum.	Lbs.	Value.	Average Price.
		\$	Cents.
1900.....	6,000	300	5·00
1901.....	773,590	46,415	5·97
1902.....	1,535,730	84,465	5·49
1903.....	1,406,000	77,510	5·51
(Tons corundum ore.....	267	2,670	(\$10·00)
1904.....	1,986,290	109,545	5·51
1905.....	3,288,267	149,153	4·48
1906.....	4,548,176	204,973	4·50
1907.....	3,785,450	177,922	4·70
1908.....	2,178,790	100,398	4·60
1909.....	2,981,634	162,492	5·45
1910.....	3,740,900	198,680	5·31

Statistics since 1900, showing the quantities of ore treated, the corundum produced, and the sales or shipments in Canada and in other countries, are given in Table 1.

ABRASIVE MATERIALS.—TABLE 1.

Production of Corundum Ore and Corundum.

Calendar Year.	Corundum-bearing rock treated.	Grain Corundum Graded.	Grain Corundum sold in Canada.	Grain Corundum Exported.	Total of Grain Corundum.
	Tons.	Tons.	Tons.	Tons.	Tons.
1900.....		60	3		3
1901.....	4,134	444	85	302	387
1902.....	7,996	806	106	662	768
1903.....	(a) 8,877	839	85	618	703
1904.....	23,187	1,654	116	877	993
1905.....	23,571	1,681	140	1,504	1,644
1906.....	45,719	2,914	162	2,112	2,274
1907.....	60,532	2,682	164	1,728	1,892
1908.....	2,678	106	99	990	1,089
1909.....	35,894	1,579	129	1,362	1,491
1910.....	37,183	1,686	106	1,764	1,870

(a) In addition to this amount which was milled in Canada, 267 tons of ore were mined and shipped to the United States for treatment there.

### GRINDSTONES, PULPSTONES, Etc.

The manufacture of grindstones is an industry which has been carried on for many years in the provinces of Nova Scotia and New Brunswick. The output to-day is no greater than it was twenty years ago, and there has been comparatively little variation from year to year. The total production, including wood pulpstone, &c., in 1910, was 3,973 tons, valued at \$47,196, as compared with 4,275 tons, valued at \$54,664 in 1909, and 3,843 tons, valued at \$48,128 in 1908.

These abrasives are quarried from the Millstone Grit of the Carboniferous formation, which occupies a large portion of the surface of the eastern half of the province of New Brunswick and the northern and northwestern parts of Nova Scotia.

The localities at which quarrying operations are chiefly carried on are at Lower Cove, and Quarry island, near Merigomish, in Nova Scotia, and in New Brunswick on Chaleur bay, and at Woodpoint and Rockport on the Bay of Fundy.

The grindstones are all shipped in a finished condition, and are worth from \$10 to \$12 per ton.

About 125 tons of pulpstones, valued at \$3,700 were shipped in 1910, to Canadian pulp and paper mills. These stones weigh about  $2\frac{1}{2}$  tons each, and are usually made about 27" face by 54" diameter. About 61 tons of scythe stones, put up in one-quarter gross boxes, thirty pounds to the box, were sold at a value of \$2,000. At some of the quarries there is a considerable production of foundation and building stone, besides rough stone for breakwater and harbour works.

Most of the pulpstones are made at Renous Bridge, New Brunswick, by the Miramichi Quarry Company. This quarry also produces an excellent building stone, which finds a market in Quebec, Montreal and Toronto.

Statistics of the production of grindstones by provinces, since 1886, are given in Table 2.

ABRASIVE MATERIALS.—TABLE 2.  
Annual Production of Grindstones.

Calendar Year.	NOVA SCOTIA.		NEW BRUNSWICK.		TOTAL.		Average Value per Ton.
	Tons.	Value.	Tons.	Value.	Tons.	Value.	
		\$		\$		\$	\$
1886.....	1,765	24,050	2,255	22,495	4,020	46,545	11 58
1887.....	1,710	25,020	3,582	38,988	5,292	64,008	12 10
1888.....	1,971	20,400	3,793	30,729	5,764	51,129	8 87
1889.....	712	7,128	2,692	23,735	3,404	30,863	9 07
1890.....	850	8,536	4,034	33,804	4,884	42,340	8 67
1891.....	1,980	19,800	2,499	22,787	4,479	42,587	9 51
1892.....	2,462	27,610	2,821	23,577	5,283	51,187	9 69
1893.....	2,112	21,000	2,488	17,379	4,600	38,379	8 34
1894.....	2,128	16,000	1,629	16,717	3,757	32,717	8 71
1895.....	1,400	14,000	2,075	17,932	3,475	31,932	9 19
1896.....	1,450	14,500	2,263	18,810	3,713	33,310	8 97
1897.....	1,407	17,500	3,165	24,840	4,572	42,340	9 26
1898.....	1,422	12,350	3,513	32,425	4,935	44,775	9 07
1899.....	1,378	10,300	3,133	32,965	4,511	43,265	9 59
1900.....	1,411	12,600	4,128	40,850	5,539	53,450	9 65
1901.....	358	3,200	4,223	42,490	4,581	45,690	9 97
1902.....	1,074	8,118	3,559	36,000	4,633	44,118	9 52
1903.....	1,337	9,562	4,201	38,740	5,538	48,302	8 72
1904.....	1,029	7,332	3,620	35,450	4,649	42,782	9 20
1905.....	1,020	10,200	4,520	52,175	5,540	62,375	11 25
1906.....	1,023	9,680	4,340	50,134	5,363	59,814	11 15
1907.....	551	4,480	4,863	55,896	5,414	60,376	11 15
1908.....	473	4,803	3,370	43,325	3,843	48,128	12 52
1909.....	312	3,204	3,963	51,460	4,275	54,664	12 79
1910.....	387	3,496	3,586	43,700	3,973	47,196	11 88

The imports of grindstones into Canada, principally into the provinces of Ontario and Quebec, reached a total value during the calendar year, 1910, of \$71,394. The value of the other abrasives imported during the same period includes: burrstones, valued at \$854; emery, \$40,400; manufactures of emery, \$92,890; pumice stone, \$14,829; sandpaper, \$148,384; iron sand for glass or granite polishing or for paving stone, \$6,647; a total value of \$304,004.

Statistics of the exports and imports of grindstones and other abrasives are shown in the following tables:—

ABRASIVE MATERIALS.—TABLE 3.  
Exports of Grindstones.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1884.....	28,186	1893.....	21,672	1902*.....	24,489
1885.....	22,606	1894.....	12,579	1903*.....	27,659
1886.....	24,185	1895.....	16,723	1904*.....	35,612
1887.....	23,769	1896.....	19,139	1905*.....	24,868
1888.....	23,176	1897.....	18,807	1906*.....	31,978
1889.....	29,982	1898*.....	25,588	1907.....	32,534
1890.....	18,564	1899*.....	23,288	1908.....	19,721
1891.....	28,433	1900*.....	42,128	1909.....	13,942
1892.....	23,567	1901*.....	29,130	1910.....	23,502

\* Including stone for the manufacture of grindstones.

## ABRASIVE MATERIALS.—TABLE 4.

## Imports.

Fiscal Year.	GRINDSTONES.		Burrstones. (c)	Emery. (a)	Mfrs. of Emery, (b)	Pumice Stone. (d)
	Tons.	Value.	Value.	Value.	Value.	Value.
		\$	\$	\$	\$	\$
1880 .....	1,044	11,714	12,049			
1881 .....	1,359	16,895	6,337			
1882 .....	2,098	30,654	15,143			
1883 .....	2,108	31,456	13,242			
1884 .....	2,074	30,471	5,365			
1885 .....	1,148	16,065	4,517	5,066	4,920	9,384
1886 .....	964	12,803	4,062	11,877	5,832	2,777
1887 .....	1,309	14,815	3,545	12,023	4,598	3,594
1888 .....	1,721	18,263	4,753	15,674	4,001	2,890
1889 .....	2,116	25,564	5,465	13,565	3,948	3,232
1890 .....	1,567	20,569	2,506	16,922	5,313	3,003
1891 .....	1,381	16,991	2,089	16,179	6,665	3,696
1892 .....	1,484	19,761	1,464	17,782	6,492	3,282
1893 .....	1,682	20,987	3,552	17,762	5,606	3,798
1894 .....	1,918	24,426	3,029	14,433	2,223	4,160
1895 .....	1,770	22,834	2,172	14,569	7,775	3,609
1896 .....	1,862	26,561	2,049	16,287	11,913	3,721
1897 .....	1,521	25,547	1,827	16,318	11,231	2,903
1898 .....		22,217	1,813	17,661	15,478	3,829
1899 .....		27,476	1,759	21,454	22,343	5,973
1900 .....		34,382	1,546	19,312	25,615	5,604
1901 .....		39,063	5,762	16,311	22,190	5,516
1902 .....		40,838	2,569	14,476	23,892	7,254
1903 .....		53,388	586	18,058	22,177	6,152
1904 .....		46,039	35	21,626	29,273	6,557
1905 .....		49,747	2,607	21,980	33,250	8,447
1906 .....		59,627	2,661	21,781	42,080	9,053
1907 .....		40,780	245	20,498	41,086	5,745
1908 .....		65,125	3,396	26,159	57,760	8,917
1909 .....		56,692	1,141	25,931	47,700	8,117
1910 .....		73,427	1,973	28,482	73,537	12,011

(a.) Emery in bulk, crushed or ground. Duty free.

(b) Emery and carborundum wheels and manufactures of emery or carborundum.

(c) Burrstones in blocks, rough or unmanufactured, not bound up or prepared by binding into millstones.

(d) Pumice and pumice stone, ground or unground. Duty free.



**TRIPOLITE.**

A small shipment of 22 tons, valued at \$134, was reported in 1910, from St. Anns, Cape Breton, by the Premier Tripolite Co. of New York.

Statistics of shipments since 1896, are shown in Table 5.

## ABRASIVE MATERIALS.—TABLE 5.

**Annual Shipments of Tripolite.**

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1896.....	644	9,960	1904.....	320	6,400
1897.....	15	150	1905.....	200	3,600
1898.....	1,017	16,660	1906.....	Nil.	Nil.
1899.....	1,000	15,000	1907.....	30	225
1900.....	336	1,950	1908.....	30	195
1901.....	850	15,300	1909.....	Nil.	Nil.
1902.....	1,052	16,470	1910.....	22	134
1903.....	835	16,700			

## ASBESTOS.

The mining or quarrying of asbestos in Canada, is still confined to the Eastern Townships, province of Quebec, in the districts of Black Lake, Thetford, East Broughton and Danville, the commercial exploitation of these deposits having been begun about 1878.

Other occurrences of the mineral have been noted and some shipments were at one time made from the township of Denholm, Ottawa county, north of the city of Ottawa.

The asbestos deposits and the asbestos industry have been the subject of special reports published by the Mines Branch. The first edition "Asbestos: its Occurrence, Exploitation and Uses," published in 1905, was soon exhausted, and a new and enlarged edition<sup>1</sup> has recently been issued.

The total shipments in 1910, are reported as 77,508 tons of asbestos, valued at \$2,555,974, and 24,707 tons of asbestic, valued at \$17,629. The shipments in 1909, were 63,349 tons of asbestos, valued at \$2,284,587, and 23,951 tons of asbestic, valued at \$17,188. The increase in asbestos shipments in 1910, being 22 per cent in tonnage and 11.9 per cent in value.

The number of men employed in mines and mills in 1910, is reported as 3,693, at a wage cost of \$1,528,544. While the shipments were as already given, the actual output during the year was reported as 5,449 tons of crude, and 94,981 tons of mill stock, produced from 1,556,015 tons of asbestos rock, or a total output of 100,430 tons. Stock on hand at the end of the year totalled 41,903 tons, as compared with 20,921 tons on hand at December 31, 1909.

The following tabulated statement shows in detail the output and shipments during 1910, and the stock on hand at the end of the year.

ASBESTOS.—TABLE 1.

### Output and Shipments, Calendar Year 1910.

—	Output.	Shipments.			Stock on hand Dec. 31.	
	Tons.	Tons.	Value.	Per Ton.	Tons.	Value.
Crude, No. 1 .....	2,181	1,817	\$ 471,675	259.58	1,702	446,675
" No. 2. ....	3,268	1,923	192,833	100.28	3,219	440,571
Mill stock No. 1. ....	16,720	13,480	735,244	54.54	6,978	398,895
" No. 2. ....	56,395	43,414	1,013,251	23.34	26,613	628,528
" No. 3. ....	21,866	16,874	142,971	8.47	3,391	29,177
Total asbestos .....	100,430	77,508	2,555,974	32.98	41,903	1,943,846
Asbestic .....	.....	24,707	17,629	0.71	.....	.....

In the absence of a uniform classification of asbestos of different grades, the above subdivisions have been adopted purely on a valuation basis; crude

<sup>1</sup> "Chrysotile-Asbestos, Its Occurrence, Exploitation, Milling and uses," by Fritz Cirkel, Mines Branch, Dept. of Mines, Ottawa, 1910.

No. 1 comprising material valued at \$200 and upwards, and crude No. 2 under \$200. Mill stock No. 1 includes stock valued at from \$45 to \$100; No. 2 from \$15 to \$30; and No. 3 under \$15.

### Range of Prices of Asbestos during the Years 1907-8-9-10.

	1907.		1908.		1909.		1910.	
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Crude, No. 1.....	225 00	to 300 00	267 00	to 350 00	200 00	to 300 00	200 00	to 300 00
" 2.....	100 00	" 200 00	75 00	" 225 00	100 00	" 175 00	55 00	" 165 00
Mill stock, No. 1....	57 00	" 163 00	60 00	" 100 00	45 00	" 100 00	47 00	" 91 00
" 2.....	18 00	" 50 00	20 00	" 50 00	20 00	" 40 00	16 50	" 30 00
" 3....	8 00	" 15 00	5 00	" 13 00	6 00	" 10 00	5 00	" 15 00
Asbestic .....	0 50	" 2 00	0 35	" 1 16	0 35	" 1 28	0 40	" 1 27

The detailed shipments of asbestos in 1909, the stock on hand at 31st December, 1909, and at 31st December, 1908, are shown in the next table.

	Production, 1909.			Stock on hand Dec. 31, 1909.		Stock on hand Dec. 31, 1908.	
	Short Tons.	Value.	Per ton.	Short Tons.	Value.	Short Tons.	Value.
		\$	\$ cts.		\$		\$
Crude, No. 1.....	912.3	246,655	270 37	1,138	310,417	432	129,450
" 2.....	2,162	328,855	152 11	2,076	324,719	382	72,775
Mill stock, No. 1....	14,776	785,731	53 18	3,791	209,962	2,480	243,534
" 2.....	32,417	800,728	24 70	11,823	317,823	4,205	138,423
" 3....	13,082	122,618	9 37	2,093	16,758	1,170	14,363
Total asbestos.	63,349.3	2,284,857	36 06	20,921	1,179,679	8,669	598,545
Total asbestic.	23,951	17,188	0 72				
Grand total. ..	87,300.3	2,301,775					

The rapid increase in the ratio of stock on hand to the total shipments is a matter worthy of special note. An examination of the statistics shows that in 1908 the ratio of the quantity of asbestos on hand to the total shipments during the year was 13 per cent, while a similar ratio of values was 23 per cent. In 1909, the quantity of asbestos on hand at the close of the year was equivalent to 33 per cent of the year's shipment, while in value the ratio was 52 per cent. The year 1910 again shows much greater stock, the quantity of asbestos on hand at the close of the year being equivalent to 54 per cent of the year's shipment, and in value to no less than 76 per cent.

This increase in stocks, accompanied by continued increase in shipments, appears to indicate an output beyond the present capacity of the market to absorb, particularly in the production of the high grades of crude asbestos, and the movement has naturally been accompanied by a distinctly lower average range of prices obtained for all grades during the past two years.

The shipments of crude asbestos and mill stock since 1903 are separately shown in Table 2. The record indicates that during the past eight years there has been but little variation in the quantity shipped as crude, the average price of which, however, nearly doubled between 1903 and 1908.

The shipments of mill stock on the other hand have been increased from 27,995 tons in 1903 to 73,768 tons in 1910, the average price per ton during that time having varied between the limits of \$19.79 and \$29.84.

ASBESTOS.—TABLE 2.

## Annual Production of Crude and Mill Stock, 1903-10.

Calendar Year.	CRUDE.			MILL STOCK.		
	Short Tons.	Value.	Per ton.	Short Tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
1903 .....	3,134	361,867	115 46	27,995	554,021	19 79
1904 .....	4,410	534,874	121 28	31,201	678,628	21 75
1905 .....	3,767	472,859	125 53	46,902	1,013,500	21 61
1906 .....	3,841	635,345	165 41	56,920	1,401,083	24 61
1907 .....	4,327	830,632	191 97	57,803	1,654,135	28 62
1908 .....	3,345 5	669,232	200 04	63,202	1,886,129	29 84
1909 .....	3,074 3	575,510	187 20	60,275	1,709,077	28 35
1910 .....	3,740	664,508	177 66	73,768	1,891,466	25 64

Table 3 shows the total shipments of asbestos and asbestic separately, each year since 1880.

## ASBESTOS.--TABLE 3.

## Annual Production since 1880.

Calendar Year	ASBESTOS.			ASBESTIC.		
	Short Tons.	Value.	Per ton.	Short Tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
1880 (a).....	380	24,700	65 00			
1881 (a).....	540	35,100	65 00			
1882 (a).....	810	52,630	65 00			
1883 (a).....	955	68,750	71 99			
1884 (a).....	1,141	75,097	65 82			
1885 (a).....	2,440	142,441	58 38			
1886 (a).....	3,458	206,251	59 64			
1887.....	4,619	226,976	48 92			
1888.....	4,404	255,007	57 90			
1889.....	6,113	426,554	69 78			
1890.....	9,860	1,260,240	127 81			
1891.....	9,279	999,878	107 76			
1892.....	6,082	390,462	64 20			
1893.....	6,331	310,156	86 81			
1894.....	7,630	420,825	55 15			
1895.....	8,753	368,175	42 05			
1896.....	10,892	423,066	38 84	1,358	6,790	5 00
1897.....	13,202	399,528	29 99	17,240	45,840	2 66
1898.....	16,124	475,131	29 47	7,661	16,066	2 10
1899.....	17,790	468,635	26 34	7,746	17,214	2 22
1900.....	21,621	729,886	33 76	7,520	18,545	2 47
1901.....	32,892	1,248,645	37 96	7,325	11,114	1 52
1902.....	30,219	1,126,688	37 28	10,197	21,631	2 20
1903.....	31,129	915,888	29 42	10,548	13,869	1 31
1904.....	35,611	1,213,502	34 08	12,854	12,856	1 00
1905.....	50,669	1,486,359	29 33	17,594	16,900	0 96
1906.....	60,761	2,036,428	33 52	21,424	23,715	1 11
1907.....	62,130	2,484,767	39 99	28,296	20,275	0 72
1908.....	66,548	2,555,361	38 40	24,225	17,974	0 74
1909.....	63,349	2,284,587	36 06	23,951	17,188	0 72
1910.....	77,508	2,555,974	32 98	24,707	17,629	0 71

(a) Figures of export taken as production.

## EXPORTS AND IMPORTS.

Supplying, as it does, the greater part of the world's demand, the Canadian output of asbestos finds a wide distribution.

Exports to Great Britain, United States, Germany and other countries during the past seven calendar years, as compiled from the reports of the Customs Department are shown in Table 4, and the total exports each year since 1892 in Table 5.

Attention has been called to the fact that these figures apparently do not accurately indicate the destination of exports, that Germany, for instance, is a much larger consumer of Canadian asbestos than is shown by these figures.



This may possibly be explained by the fact that frequently raw materials of this kind are sold in bond to brokers or dealers in New York, and by them resold to consumers in other countries.

ASBESTOS.—TABLE 4.

## Exports of Canadian Asbestos by Countries, 1903-1910.

Calendar Year	TO GREAT BRITAIN.		TO UNITED STATES.		TO GERMANY.		TO OTHER COUNTRIES.		TOTAL EXPORTS.		Average per ton.
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	
		\$		\$		\$		\$		\$	\$ cts.
1903.	2,743	40,120	24,252	714,781	1,429	25,150	3,356	110,982	31,780	891,033	28 04
1904.	6,602	210,175	25,957	762,300	2,463	94,141	2,250	94,271	37,272	1,160,887	31 15
1905.	9,731	305,056	29,696	811,080	2,969	100,061	4,635	169,918	47,031	1,386,115	29 47
1906.	9,435	318,313	39,767	1,058,513	3,654	82,117	6,998	230,314	59,854	1,689,257	28 22
1907.	5,432	200,909	44,861	1,312,582	225	8,195	6,235	147,613	56,753	1,669,299	29 41
1908.	5,221	288,290	50,503	1,314,337	341	9,470	5,145	230,666	61,210	1,842,763	30 11
1909.	5,227	204,978	45,675	1,243,755	693	17,706	5,376	263,378	56,971	1,729,857	30 36
1910.	6,700	280,452	57,939	1,505,477	440	15,925	6,406	306,778	71,485	2,108,632	29 50

ASBESTOS.—TABLE 5.

## Annual Exports, Calendar Years 1892-1910.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
		\$	\$ cts.			\$	\$ cts.
1892. ....	5,380	373,103	69 35	1902. ....	31,074	995,071	32 02
1893. ....	5,917	338,707	57 24	1903. ....	31,780	891,033	28 04
1894. ....	7,987	477,837	59 82	1904. ....	37,272	1,160,887	31 14
1895. ....	7,442	421,690	56 66	1905. ....	47,031	1,386,115	29 47
1896. ....	11,842	567,967	47 96	1906. ....	59,854	1,689,257	28 22
1897. ....	15,570	473,274	30 40	1907. ....	56,753	1,669,299	29 41
1898. ....	15,346	494,012	32 19	1908. ....	61,210	1,842,763	30 11
1899. ....	17,883	473,148	26 46	1909. ....	56,971	1,729,857	30 36
1900. ....	16,993	693,105	39 61	1910. ....	71,485	2,108,632	29 50
1901. ....	32,269	1,069,918	33 16				

Although the chief source for the raw material, Canada does not yet manufacture all the asbestos goods required for home consumption. There is, therefore, a considerable importation of asbestos goods under the import classification, 'Asbestos in any form other than crude and all manufactures of,' the duty being 25 per cent. The annual value of the imports is shown in Table 6.

## ASBESTOS.—TABLE 6

## Imports Fiscal Years 1885-1910.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1885....	674	1894.....	20,021	1903.....	75,465
1886.....	6,831	1895.....	26,094	1904.....	83,827
1887.....	7,836	1896.....	23,900	1905.....	116,836
1888.....	8,793	1897.....	19,032	1906.....	137,974
1889.....	9,943	1898.....	26,389	1907 (9 months) ..	127,509
1890.....	13,250	1899.....	32,607	1908.....	190,980
1891.....	13,298	1900.....	43,455	1909.....	180,598
1892.....	14,090	1901.....	50,829	1910*	198,710
1893.....	19,181	1902.....	52,464		

\* Asbestos in any form other than crude, and all manufactures of. Duty 25 per cent.

The imports of asbestos into the United Kingdom will be of interest, as indicating the possible market in that country for this product.

These imports, and the sources of supply, are shown as follows:—

## Imports of Raw Asbestos into the United Kingdom, 1907-1909.

Country.	1907.		1908.		1909.	
	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.
		\$		\$		\$
Russia....	1,545	143,708	1,162	123,146	599	71,063
Germany.....	290	39,318	309	40,243	351	48,681
Portuguese East Africa.....	84	17,199	258	39,678	324	56,526
Italy.....	176	27,764	169	26,961	215	38,369
United States.....	543	21,462	1,182	42,150	1,549	40,549
Other foreign countries.....	136	15,271	149	17,340	167	12,410
Total foreign.....	2,774	264,722	3,229	289,518	3,205	267,598
Cape of Good Hope.....	33	2,360	272	17,389	424	30,519
Natal.....	52	10,950	26	4,667	78	9,247
Canada.....	4,408	214,382	3,760	194,691	2,727	144,691
Other British possessions.....	10	759	89	12,507	43	5,596
Total British possessions...	4,503	228,451	4,147	229,254	3,272	190,053
Grand Total.....	7,277	493,173	7,376	518,772	6,477	457,651

## ASBESTOS.—TABLE 7.

World's Production, 1903-1910, in Metric Tons (2206.4 lbs.)

	1903	1904	1905	1906	1907	1908	1909	1910
Canada (b).....	28,240	32,306	45,967	55,122	56,364	60,372	57,470	70,315
United States (c).....	805	1,343	2,820	1,538	592	849	2,799	3,350
Russia (e).....	5,624	7,502	7,266	9,201	10,430	9,835	13,343	.....
Cape Colony (e).....	(g) 276	373	454	473	548	1,149	*	.....
Cyprus (e).....	.....	.....	.....	(g) 19	(g) 89	472	*	.....
Rhodesia (f).....	.....	.....	.....	.....	.....	50	247	301
West Australia.....	.....	.....	.....	.....	.....	41	*	.....

\* Figures not available.

(b) Mines Branch, Ottawa.

(e) Home Office, London.

(c) United States, Geological Survey.

(g) Exported.

(f) Chamber of Mines, Bulawayo.

The following is a list of the principal asbestos companies in Canada:—

Name of Operator.	Location of Mine.	Address.
Amalgamated Asbestos Corporation, Ltd.....	Coleraine, Thetford...	Montreal, 363 St. James St.
Black Lake Consolidated Asbestos Co.....	" " ..	Montreal.
Megantic Mining Company.....	" " ..	88 McGill St.
Johnston's Asbestos Co., Ltd.....	Thetford, Black Lake..	Thetford Mines, Que.
Bell Asbestos Mine.....	" " ..	" "
Robertson Asbestos Mining Co.....	" " ..	" "
Jacob's Asbestos Mining Co., Ltd.....	" " ..	Montreal, 282 St. Catharine St. W.
The B & A Asbestos Co.....	" " ..	Robertsonville, Que.
The Berlin Asbestos Co.....	" " ..	Robertson Sta., Que.
The Asbestos & Asbestic Co., Ltd.....	Shipton .....	Asbestos, Que.
Broughton Asbestos Fibre Co.....	Broughton .....	East Broughton Sta., Que.
Eastern Townships Asbestos Co.....	" .....	" "
Boston Asbestos Co., Ltd.....	" .....	" "
The Ling Asbestos Co.....	" .....	" "
The Frontenac Asbestos Mining Co., Ltd.....	" .....	Quebec, 81 St-Peter St.
Montreal Asbestos Co., Ltd.....	Broughton East.....	Montreal, 171 St. James St.
Brompton Lake Asbestos Co.....	Brompton Lake.....	Montreal, 17 Victoria Sq.
W. H. Lambly.....	.....	Inverness, Que.
Belmina Consolidated Asbestos Co., Ltd.....	Wolfton.....	Coleraine Sta., Que.

## CHROMITE.

Shipments of chromite were made in 1910 to the extent of 299 tons, valued at \$3,734 from ore mined during previous years.

The comparatively low price, \$14 to \$16 per long ton, quoted for 50 per cent New Caledonia ore ex-ship New York, is no doubt largely responsible for the falling off in the Canadian industry.

The chrome ore deposits of the Eastern Townships, Quebec, have been described in a special report<sup>1</sup> published by the Mines Branch in 1909.

Statistics of production since 1886, are shown in Table 1, following, the total during the last seven years being divided into high and low grade. Material classed as high grade includes both ore and concentrates, ranging from 48 per cent to 50 per cent  $\text{Cr}_2\text{O}_3$  and higher, while the low grade is composed chiefly of the crude ore.

CHROMITE.—TABLE 1.  
Annual Production in Canada, 1886-1910.

Calendar Year.	HIGH GRADE.			LOW GRADE.			TOTALS.		
	Short Tons.	Value.	Average Prices.	Short Tons.	Value.	Average Prices.	Short Tons.	Value.	Average Prices.
		\$	\$ cts.		\$	\$ cts.		\$	\$ cts.
1886	.....	.....	.....	.....	.....	.....	60	945	15 75
1887	.....	.....	.....	.....	.....	.....	38	570	15 00
1888 to 1893	.....	.....	.....	.....	.....	.....	No Output { .....		
1894	.....	.....	.....	.....	.....	.....	1,000	20,000	20 00
1895	.....	.....	.....	.....	.....	.....	3,177	41,300	13 00
1896	.....	.....	.....	.....	.....	.....	2,342	27,004	11 53
1897	.....	.....	.....	.....	.....	.....	2,637	32,474	12 31
1898	.....	.....	.....	.....	.....	.....	2,021	24,252	12 00
1899	.....	.....	.....	.....	.....	.....	2,010	21,842	10 86
1900	.....	.....	.....	.....	.....	.....	2,335	27,000	11 56
1901	.....	.....	.....	.....	.....	.....	1,274	16,744	13 14
1902	.....	.....	.....	.....	.....	.....	900	13,000	14 44
1903	2,842	44,280	15 58	667	6,849	10 27	3,509	51,129	14 57
1904	4,630	53,976	16 08	1,424	13,170	9 25	6,074	67,146	11 05
1905	.....	.....	.....	8,575	93,301	10 88	8,575	93,301	10 88
1906	4,975	57,484	11 55	4,060	34,375	8 47	9,035	91,859	10 17
1907	3,545	41,931	11 83	3,651	30,970	8 48	7,196	72,901	10 13
1908	3,472	45,300	13 05	3,753	36,708	9 78	7,225	82,008	11 35
1909	54	720	13 33	2,416	25,884	10 71	2,470	26,604	10 77
1910	25	430	17 20	274	3,304	12 06	299	3,734	12 49

The chromite finds its chief market in the United States, although a few carloads are occasionally shipped to Canadian points.

<sup>1</sup> Report on the Chrome Iron Deposits of the Eastern Townships, province of Quebec, by Fritz Cirkel, Mines Branch, Department of Mines, Ottawa.

The exports during the calendar year, 1910, are reported as 15 tons, valued at \$150.

The following table shows the quantity and value of Canadian chromite imported into the United States during the past six years:—

**Imports of Chromite into the United States from Canada.<sup>1</sup>**

Twelve months ending June 30.	Short Tons.	Value.	Twelve months ending June 30.	Short Tons.	Value.
		\$			\$
1904.....	2,790	36,322	1908.....	6,505	69,009
1905.....	6,489	70,934	1909.....	4,455	50,042
1906.....	9,951	107,580	1910.....	269	2,892
1907.....	6,179	66,115			

<sup>1</sup> The Foreign Commerce and Navigation of the United States, Washington. Long ton in original changed to short ton.

Chrome iron ore is used chiefly for the manufacture of ferro-chrome alloys and chromium salts for pigments, and is also used for linings in steel and copper furnaces.

Prices in New York in 1907 and 1908, were practically uniform, ranging from \$17 to \$20 per long ton for 50 per cent ore.

During the first five months of 1909, prices had practically the same range, viz.: from \$17.50 to \$20; but in June the market dropped, and until the close of the year, chrome ore was quoted at from \$14 to \$16 per long ton for 50 per cent ore in New York.

As an illustration of the market for chromite in the United States, the imports into that country during the past two years are shown in the following table. The record shows a large decrease in imports in 1909.



CHROMITE.—TABLE 2.

Imports into the United States, years ending June 30, 1909 and 1910, in tons of 2,240 lbs.<sup>1</sup>

	1909.			1910.		
	Long Tons.	Value.	Per Ton.	Long Tons.	Value.	Per Ton.
		\$	\$ cts.		\$	\$ cts.
Belgium.....	2,018	28,649	14 20	3,558	49,720	13 97
Canada.....	3,978	50,042	12 58	241	2,892	12 00
France.....						
French Oceania....	11,878	125,728	10 58	9,466	89,521	9 46
Germany.....						
Greece.....	3,500	33,214	9 49	7,740	68,126	8 80
India.....	350	1,005	2 87	231	466	2 02
Italy.....	459	6,932	15 10			
Japan.....	2,781	20,529	7 38	2,290	16,959	7 40
Netherlands.....				125	2,110	16 88
Portuguese Africa..	4,042	63,926	15 82	19,455	236,691	12 17
Turkey in Asia.....				1,100	7,000	6 36
United Kingdom....	786	10,559	13 43	747	5,038	12 10
Totals.....	29,792	340,584	11 43	44,953	482,523	10 73

<sup>1</sup> The Foreign Commerce and Navigation of the United States, 1909-1910.

CHROMITE.—TABLE 3.

World's Production of Chromite in Metric Tons (2,204.6 lbs.).

Locality.	1905	1906	1907	1908	1909	1910
Australia (a).....	53	15	30	.....	*	.....
Bosnia and Herzegovina (a)....	186	320	310	500	*	.....
Canada (d).....	7,779	8,196	6,528	6,554	2,241	271
Greece (a).....	8,900	11,530	11,730	4,350 (c)	9,600	.....
India (a).....	2,751	4,445	18,597	4,821 (c)	9,398	.....
New Caledonia (Production)....	(a) 76,933	(b) 84,241	(b) 3,800	(a) 15,800	*	.....
" (Exports).....	(b) 51,374	(a) 57,367	(c) 31,552	(c) 46,309	(c) 32,136	.....
Rhodesia.....	Nil.	3,308	7,273	(c) 12,118	(e) 23,243	(c) 39,918
Russia (a).....	27,047	16,976	26,357	(c) 9,278	*	.....
Norway (a).....	Nil.	Nil.	Nil.	Nil.	*	.....
United States (f).....	22	109	295	365	608	208
Turkey (g).....	No complete statistics available.					.....

\* Statistics not yet available.

(a) Home Office, London.

(b) L'Industrie Minérale, Paris.

(c) Mineral Industry, New York, 1908.

(d) Department of Mines, Ottawa.

(e) Rhodesia "Chamber of Mines".

(f) Geological Survey, United States.

(g) Turkey is one of the most important producers of chromite, the ore being found in many parts of both European and Asiatic Turkey. Unfortunately no complete records of production are available. According to statistics collected and published by the Home Office, the exports from several ports during the years 1903 to 1908 were as follows, in metric tons:—

	1904.	1905.	1906.	1907.	1908.
Salonica .....	8,000	5,700	5,600	4,900	2,100
Kosovo.....	3,100	3,000	4,100	2,800	1,300
	12,000	12,000	13,000	12,000	12,000
Derendge and Marmora ports.....	to	to		to	to
	15,000	15,000		14,000	14,000
Smyrna.....	838		1,080		443
Adana .....	To value				
	of £500	£2,824		£1,000	
Adalia.....				700	

## COAL.

The total production of all classes of coal, including lignite, bituminous, and anthracite, in Canada during 1910, was, according to returns received by this Branch, 12,909,152 tons, as compared with a production in 1909 of 10,501,475 tons, showing an increase of 2,407,677 tons or nearly 23 per cent. The total approximate selling value of the coal at the mines in 1910 was \$30,909,779 or \$2.39 per ton, as compared with a total value in 1909 of \$24,781,236 or an average of \$2.36 per ton.

The large increase in production may be ascribed in part to the more complete resumption of mining operations in Nova Scotia following the settlement of the strike at Sydney, but chiefly to the great development of the coal mining industry in the western provinces, particularly in Alberta and British Columbia. The production of coal in Nova Scotia in 1909 showed a decrease of 1,000,450 tons as compared with 1908, so that while the production of this Province in 1910 shows an increase of 779,053 tons the output was still less than that of 1908. In British Columbia, on the other hand, the production of coal in 1909 showed an increase of 272,419 tons or nearly 12 per cent over 1908, and the year 1910 shows a further increase of 724,618 tons or nearly 28 per cent. So, also in Alberta the year 1909 shows an increase of 309,080 tons or 18 per cent, and the year 1910 a further increase of 899,728 tons or 45 per cent.

Bituminous coal forms by far the largest proportion of the total output, being mined exclusively in the Maritime Provinces, British Columbia, and the Crowsnest Pass region of southwestern Alberta. There is but one anthracite mine in Canada, at Bankhead near Banff, Alberta, operated by the Bankhead Mines Limited. This mine possesses the only briquetting plant in operation in the country.

Statistics of the production by provinces during the past three years are shown in Table 1, and Table 2 shows the increases and decreases in each year as compared with the previous year.

It may be explained that the term production in these tables applies to the amount of coal actually sold or used by the producers, in contradistinction to output, which applies to the coal extracted from the mine and which in some cases includes coal lost or unsaleable or coal carried into stock on hand at the end of the year.

It will be observed that in 1910 an increased production is reported for every province with the exception of Saskatchewan, in which a falling off of 10,969 tons is shown. But as one or two small mines in this Province neglected to furnish returns, it is quite possible that a complete record would have shown the output at least as large as in 1909.

COAL.—TABLE 1.

Production by Provinces, 1908-9-10, in tons of 2,000 lbs.

Province.	1908.		1909.		1910.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
Nova Scotia.....	6,652,539	\$13,364,476	5,652,089	\$11,354,643	6,431,142	\$12,919,705
British Columbia...	2,333,708	7,292,838	2,606,127	8,144,147	3,330,745	10,408,580
Alberta.....	1,685,661	4,127,311	1,994,741	4,838,109	2,894,469	7,065,736
Saskatchewan.....	150,556	253,790	192,125	296,339	181,156	293,923
New Brunswick.....	60,000	135,000	49,029	98,496	55,455	110,910
Yukon Territory.....	3,847	21,158	7,364	49,502	16,185	110,925
Totals.....	10,886,311	25,194,573	10,501,475	24,781,236	12,909,152	30,909,779

COAL.—TABLE 2.

Comparison of Production 1908 with 1909, and 1909 with 1910.

Province.	(i) INCREASE OR (d) DECREASE.			
	Years 1908 and 1909.		Years 1909 and 1910.	
	Tons.	Per cent.	Tons.	Per cent.
Nova Scotia.....	(d) 1,000,450	15.04	(i) 779,053	13.78
British Columbia.....	(i) 272,419	11.67	(i) 724,618	27.80
Alberta.....	(i) 309,080	18.34	(i) 899,728	45.11
Saskatchewan.....	(i) 41,569	27.61	(d) 10,969	5.71
New Brunswick.....	(d) 10,971	18.29	(i) 6,426	13.11
Yukon Territory.....	(i) 3,517	91.42	(i) 8,821	119.79
Totals for Canada.....	(d) 384,836	3.535	(i) 2,407,677	22.93

The relative importance of the different provinces as coal producers is indicated in the next table, in which is shown the proportional contributions of each province to the total coal production of Canada in 1874, 1890, and yearly since 1900. The western provinces in 1910 produced practically the same tonnage as Nova Scotia and New Brunswick. Alberta's production has been increasing very rapidly and is now very close to that of British Columbia, having contributed 22.4 per cent of the total in 1910 as compared with 25.8 per cent by British Columbia. In 1905 this Province produced 10.8 per cent of the total and in 1890 only 4 per cent.



Province.	1874.	1890.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
	%	%	%	%	%	%	%	%	%	%	%	%	%
Nova Scotia.....	91	71	62.9	64.4	69.4	71.3	68.0	65.5	64.07	60.79	61.40	54.29	50.25
New Brunswick.....													
Saskatchewan*.....			0.7	0.7	0.9	1.5	1.5	1.2	1.11	1.44	1.37	1.83	1.40
Alberta*.....		4	5.4	5.2	5.4	6.2	8.0	10.8	12.77	15.14	15.42	18.99	22.42
British Columbia.....	8	25	31.0	29.6	24.2	21.0	22.5	22.4	21.98	22.50	21.77	24.82	25.80
Yukon Territory.....				0.1	0.1			0.1	0.07	0.13	0.04	0.07	0.13

\*Alberta and Saskatchewan were established as provinces on September 1, 1905. For the purpose of comparison, the coal production during the years previous to that date has been separated according to the present boundaries of these Provinces.

Of the total coal production in Canada during the past year 8,956,450 tons were reported as sold for consumption in Canada, 1,847,943 tons sold for export to the United States, and 291,273 tons sold for export to other countries, or total sales of 11,095,666 tons; 759,703 tons were used by colliery operators in making coke and 1,053,783 tons were used for colliery purposes and by workmen. In addition to the coal thus disposed of, 63,647 tons were mined and added to stock at the end of the year and 243,716 tons reported as waste; these two items are not included as 'Production,' but bring the total output up to 13,216,515 tons.

Thus of the total output about 83.9 per cent was placed directly in the market, 5.7 per cent made into coke by the mine operators, 7.9 per cent used in colliery consumption and for workmen, 1.8 per cent reported as waste. The quantities entered as loss due to washing, breakage, etc., do not necessarily include all the losses due to these causes since many companies do not make any returns under this heading. Also the quantity entered as sold for consumption in Canada probably includes a small quantity which is ultimately exported.

Notwithstanding Canada's large coal resources, the total domestic production (including that exported) was equivalent in 1910 to only about 50 per cent of the total consumption, there having been imported for home consumption during 1910, 10,597,982 tons. The total consumption of coal as shown in subsequent tables was 20,970,226 tons, or an average of about 2.800 tons per capita, while the production averaged about 1.723 tons per capita of population. The principal coal-fields are located on the extreme east and in the far west, while the central Provinces of Ontario and Quebec which contain the great bulk of the population are without coal deposits. Nova Scotia coal is largely consumed within the Province and also finds a considerable market in Quebec. About 9.02 per cent of the coal production of this Province was reported as sold for export in 1910. The market in Ontario is almost altogether supplied, and that of Quebec province to a lesser degree, by coal imported from the nearer fields of the adjacent states of the United States. There are no anthracite coals in eastern Canada, and our requirements of this fuel have to be met entirely by imports from Pennsylvania. Manitoba is also supplied largely by importations from the United States.



The Saskatchewan production finds a local market within the Province and also in Manitoba.

Of the Alberta production about 84.8 per cent in 1910 was used by collieries and sold for consumption in Canada, chiefly within the Province; 8.4 per cent sold for export to the United States, and 6.8 per cent used for making coke which was marketed in British Columbia and in the United States. British Columbia is the largest producer of coal for export. In 1910 about 49.1 per cent of the production in this Province was used by the collieries and sold for home consumption; 39.5 per cent was sold for export, and 11.4 per cent used in making coke.

The output by provinces showing the distribution of coal mined in 1909 and 1910 is given in the next two tables:—

### Coal Output in Canada 1910.

—	Nova Scotia.	New Brunswick.	Saskatchewan.	Alberta.	Yukon.	British Columbia	Total.
Sales in Canada.....	5,003,933	53,455	173,084	2,309,438	16,135	1,400,405	8,956,450
Sales for export to U.S.....	356,089	.....	.....	243,371	.....	1,248,483	1,847,943
Sales for export to other countries.....	223,748	.....	.....	.....	.....	67,525	291,273
Total sales.....	5,583,770	53,455	173,084	2,552,809	16,135	2,716,413	11,095,666
Used by producers in making coke.....	183,560	.....	.....	196,250	.....	379,893	759,703
Used by producers for colliery consumption and workmen.....	663,812	2,000	8,072	145,410	50	234,439	1,053,783
Stock on hand Jan. 1..	149,958	.....	.....	10,074	.....	39,987	200,019
“ Dec. 31.	175,333	.....	.....	8,957	.....	79,376	263,666
Difference.....	+ 25,375	.....	.....	1,117	.....	+ 39,389	+ 63,647
Losses due to breakage or other causes.	58,645	.....	10,010	14,724	.....	160,337	243,716
Total output*...	6,515,162	55,455	191,166	2,908,076	16,185	3,530,471	13,216,515

\*Production is obtained by adding coal sold and coal used.

## Coal Output in Canada, 1909.

	Nova Scotia.	New Brunswick.	Saskatchewan.	Alberta.	Yukon.	British Columbia	Total.
Sales in Canada.....	4,496,688	45,000	183,878	1,639,515	6,864	1,096,935	7,468,880
Sales for export to U. S.....	300,134	.....	.....	114,101	.....	759,537	1,173,772
Sales for export to other countries.....	100,258	.....	.....	.....	.....	71,130	171,388
Total sales.....	4,897,080	45,000	183,878	1,753,616	6,864	1,927,602	8,814,040
Used by producers in making coke.....	169,832	.....	.....	143,854	.....	439,290	752,976
Used by producers for colliery consumption and workmen.....	585,177	4,029	8,247	97,271	500	239,235	934,459
Stock on hand Jan. 1.	150,455	.....	.....	4,646	.....	47,331	202,432
“ “ Dec. 31	154,832	.....	.....	12,150	.....	52,587	219,569
Difference.....	+ 4,377	.....	.....	+ 7,504	.....	+ 5,256	+ 17,137
Losses due to breakage or other causes.	62,405	.....	10,788	17,573	.....	63,396	154,162
Total output*...	5,718,871	49,029	202,913	2,019,818	7,364	2,674,779	10,672,774

\*Production is obtained by adding coal sold and coal used.

## Distribution of Coal mined in Canada during the Years 1907-8.

	1907.	1908.
Sales in Canada.....	7,358,135	7,715,203
Sales for export to United States.....	1,514,182	1,218,656
“ “ other countries.....	129,957	297,291
Total sales.....	9,002,274	9,231,150
Used by producers for the manufacture of coke.....	751,967	708,674
“ “ colliery consumption and workmen.....	757,185	946,487
Stock on hand January 1.....	212,559	183,443
“ “ December 31 .....	190,224	230,335
Difference.....	- 22,335	+ 46,892
Loss due to washing, breakage, or other causes.....	351,783	157,610
Total output.....	10,840,874	11,090,813

Statistics of the annual production of coal in Canada since 1874 are shown in Table 3. The total production from 1785 to 1910 has been 172,158,538 tons: of which 115,758,195 tons or 63.7 per cent are to be credited to Nova Scotia and 40,049,214 tons or 23.3 per cent to British Columbia.

Looking back over the production of the last 40 years in decimal periods we find that the production during the years 1871-1880 was 11,380,416 tons; during the next period, 1881-1890, the production was 22,001,394 tons. The next ten years, 1891-1900, showed a production of 40,381,708 tons, and during the last period, 1901-1910, the production reached a total of 80,497,726 tons.

COAL.—TABLE 3.

Annual Production showing the Increase or Decrease each year.

Year.	Tons.	Value.	Average Value per Ton.	Increase (i) or Decrease (d) in Tonnage.	Increase (i) or Decrease (d) per cent.
		\$	\$		
1785 to 1873.....	*8,534,455	.....	.....	.....	.....
1874.....	1,063,742	1,763,423	1 66		
1875.....	1,039,974	1,747,016	1 68	(d) 23,768	(d) 2.2
1876.....	994,762	1,729,546	1 74	(d) 45,212	(d) 4.3
1877.....	1,036,670	1,794,415	1 73	(i) 41,908	(i) 4.2
1878.....	1,089,744	1,941,285	1 78	(i) 53,074	(i) 5.1
1879.....	1,126,497	2,050,639	1 82	(i) 36,753	(i) 3.4
1880.....	1,482,714	2,657,194	1 79	(i) 356,217	(i) 31.6
1881.....	1,537,106	2,688,621	1 75	(i) 54,392	(i) 3.7
1882.....	1,848,148	3,248,446	1 76	(i) 311,042	(i) 20.2
1883.....	1,818,684	3,109,635	1 71	(d) 29,464	(d) 1.6
1884.....	1,984,959	3,593,831	1 81	(i) 166,275	(i) 9.1
1885.....	1,920,977	3,417,807	1 78	(d) 63,982	(d) 3.2
1886.....	2,116,653	3,739,840	1 77	(i) 195,676	(i) 10.2
1887.....	2,429,330	4,388,206	1 81	(i) 312,677	(i) 14.8
1888.....	2,602,552	4,674,140	1 80	(i) 173,222	(i) 7.1
1889.....	2,658,303	4,894,287	1 84	(i) 55,751	(i) 2.1
1890.....	3,084,682	5,676,247	1 84	(i) 426,379	(i) 16.0
1891.....	3,577,749	7,019,425	1 96	(i) 493,067	(i) 16.0
1892.....	3,287,745	6,363,757	1 94	(d) 290,004	(d) 8.1
1893.....	3,783,499	7,359,080	1 95	(i) 495,754	(i) 15.1
1894.....	3,847,070	7,429,468	1 93	(i) 63,571	(i) 1.7
1895.....	3,478,344	6,739,153	1 94	(d) 368,726	(d) 9.6
1896.....	3,745,716	7,226,462	1 93	(i) 267,372	(i) 7.7
1897.....	3,786,107	7,303,597	1 93	(i) 40,391	(i) 1.1
1898.....	4,173,108	8,224,288	1 97	(i) 387,001	(i) 10.2
1899.....	4,925,051	10,283,497	2 09	(i) 751,943	(i) 18.0
1900.....	5,777,319	13,742,178	2 38	(i) 852,268	(i) 17.3
1901.....	6,486,325	12,699,243	1 96	(i) 709,006	(i) 12.3
1902.....	7,466,681	15,210,877	2 04	(i) 780,356	(i) 15.1
1903.....	7,960,364	15,942,833	2 00	(i) 493,683	(i) 6.6
1904.....	8,254,595	16,592,231	2 01	(i) 294,231	(i) 3.7
1905.....	8,667,948	17,520,263	2 02	(i) 413,353	(i) 5.0
1906.....	9,762,601	19,732,019	2 02	(i) 1,094,653	(i) 12.6
1907.....	10,511,426	24,381,842	2 32	(i) 748,825	(i) 7.7
1908.....	10,886,311	25,194,573	2 32	(i) 374,885	(i) 3.5
1909.....	10,501,475	25,781,236	2 36	(d) 384,836	(d) 3.5
1910.....	12,909,152	30,909,779	2 39	(i) 2,407,677	(i) 22.93

\*The total production for the years 1785 to 1873 is made up as follows:—

Nova Scotia (1785 to 1873)..... 8,053,670 tons of 2,000 pounds.

British Columbia (1836 to 1873)..... 480,785 " 2,000 "

## EXPORTS AND IMPORTS.

The statistics of exports and imports of coal as given in tables following have been compiled from the reports of the Department of Customs. The total exports during 1910 were 2,377,049 tons valued at \$6,077,350, or \$2.56 per ton, as compared with exports in 1909 of 1,588,099 tons valued at \$4,456,342, or \$2.81 per ton. An increase in exports is, therefore, shown in 1910 of 788,950 tons, or about 49.7 per cent.

The total imports during 1910 were 10,597,982 tons valued at \$28,450,001, as compared with imports in 1909 of 9,872,924 tons valued at \$26,831,859, showing an increase in imports of 725,058 tons or 7.3 per cent.

Statistics of exports during 1908-9-10 showing the principal countries of destination are given in Table 4, and annual exports since 1873 in Table 5.

COAL.—TABLE 4.

## Exports of Coal produced in Canada during 1908-9-10.

Exported to	1908.		1909.		1910.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
Great Britain.....	5,557	18,065	10,671	36,403	5,872	18,901
United States.....	1,385,223	3,564,390	1,240,519	3,357,111	1,947,287	4,583,626
Newfoundland.....	194,034	532,121	175,801	493,040	203,626	574,157
Other countries.....	145,019	546,801	161,108	569,788	220,264	900,666
Totals.....	1,729,833	4,661,377	1,588,099	4,456,342	2,377,049	6,077,350

The United States is the principal market for Canadian coal exported, that country having taken about 81.9 per cent of the total exports in 1910. There were exported to Newfoundland 203,626 tons or 8.6 per cent of the total. Exports to other countries of 220,264 tons include 41,270 tons to Mexico and 29,108 tons to Australia. Considerable tonnages are also exported to Bermuda, St. Pierre, Cuba, Japan, and many other points.

COAL.—TABLE 5.

## Exports.

Calendar Year.	Produce of Canada.	Not the Produce of Canada.	Calendar Year.	Produce of Canada.	Not the Produce of Canada.
	Tons.	Tons.		Tons.	Tons.
1873.....	420,683	5,403	1892.....	823,733	93,988
1874.....	310,988	12,859	1893.....	960,312	102,827
1875.....	250,348	14,026	1894.....	1,103,694	89,786
1876.....	248,638	4,995	1895.....	1,011,235	96,836
1877.....	301,317	4,829	1896.....	1,106,661	116,774
1878.....	327,959	5,468	1897.....	986,130	101,848
1879.....	306,648	8,468	1898.....	1,150,029	99,189
1880.....	432,188	14,217	1899.....	1,293,169	101,004
1881.....	395,382	14,245	1900.....	1,787,777	62,776
1882.....	412,682	37,576	1901.....	1,573,661	53,894
1883.....	486,811	44,388	1902.....	2,090,268	23,453
1884.....	474,405	62,665	1903.....	1,954,629	27,138
1885.....	427,937	71,003	1904.....	1,557,412	27,308
1886.....	520,703	78,443	1905.....	1,635,287	86,792
1887.....	580,965	99,098	1906.....	1,835,041	44,758
1888.....	588,627	84,316	1907.....	1,894,074	101,778
1889.....	665,315	89,294	1908.....	1,729,833	102,071
1890.....	724,486	82,534	1909.....	1,588,099	161,098
1891.....	971,259	77,827	1910.....	2,377,049	159,859



Coal imported is subdivided into three classes: anthracite, including anthracite dust; bituminous round and run of mine; and bituminous slack such as will pass through a  $\frac{3}{4}$ " screen. The imports of anthracite in 1910 were 3,266,235 tons valued at \$14,735,062, an average of \$4.51 per ton, thus showing an increase of 248,391 tons over the 1909 imports. The imports of bituminous round and run of mine in 1910 were 5,966,466 tons valued at \$11,919,341, an average of \$1.99 per ton; showing an increase of 341,403 tons or 6.1 per cent over the 1909 imports. The imports of bituminous slack in 1910 were 1,365,281 tons valued at \$1,795,598 or an average of \$1.32 per ton, showing an increase of 135,264 tons or about 11 per cent over the 1909 imports.

COAL.—TABLE 6.  
Imports of Coal into Canada.

Fiscal Year.	BITUMINOUS COAL.		ANTHRACITE COAL AND ANTHRACITE DUST.		BITUMINOUS COAL DUST.	
	Tons.	Value	Tons.	Value.	Tons.	Value.
		\$		\$		\$
1880.....	457,049	1,220,761	516,729	1,509,960	3,565	8,877
1881.....	587,024	1,741,568	572,092	2,325,937	337	666
1882.....	636,374	1,992,081	638,273	2,666,356	471	900
1883.....	911,629	2,996,198	754,891	3,344,936	8,154	10,082
1884.....	1,118,615	3,613,470	868,000	3,831,283	12,782	14,600
1885.....	1,011,875	3,197,539	910,324	3,909,844	20,185	20,412
1886.....	930,949	2,591,554	995,425	4,028,050	36,230	36,996
1887.....	1,149,792	3,126,225	1,100,165	4,423,062	31,401	33,178
1888.....	1,231,234	3,451,661	†2,138,627	5,291,875	28,808	34,730
1889.....	1,248,540	3,255,171	1,291,705	5,199,481	39,980	47,139
1890.....	1,409,282	3,528,959	1,201,335	4,595,727	53,104	29,818
1891.....	1,598,855	4,060,896	1,399,067	5,224,452	60,127	36,130
1892.....	1,615,220	4,099,221	1,479,106	5,640,346	82,091	39,840
1893.....	1,603,154	3,967,764	1,500,550	6,355,285	109,585	44,474
1894.....	1,359,509	3,315,094	1,530,522	6,354,040	117,573	49,510
1895.....	1,444,928	3,321,387	1,404,342	5,350,627	181,318	52,221
1896.....	1,538,489	3,299,025	1,574,355	5,667,096	210,386	53,742
1897.....	1,543,476	3,254,217	1,457,295	5,695,168	225,562	59,609
1898.....	1,684,024	3,179,595	1,460,701	5,874,685	229,445	45,556
1899.....	2,171,358	3,691,946	1,745,460	6,490,509	276,547	44,717
1900.....	2,439,764	4,310,964	1,654,401	6,602,912	330,174	98,349
1901.....	2,516,392	4,956,025	1,933,283	7,923,950	414,432	275,559
1902.....	3,047,392	5,712,058	1,652,451	7,021,939	489,548	264,550
1903.....	3,511,412	7,776,717	1,456,713	7,028,664	550,883	420,317
1904.....	4,053,900	9,103,208	2,275,018	10,461,223	608,041	544,128
1905.....	4,176,274	8,002,896	2,604,137	12,093,371	650,261	343,456
1906.....	4,495,550	8,360,348	2,200,863	10,304,308	747,251	489,180
Calendar Year.	Bituminous round and run of mine.				Bituminous slack such as will pass through a $\frac{3}{4}$ " screen.	
1907.....	6,370,152	13,232,445	3,141,873	14,506,129	1,139,256	1,121,949
1908.....	6,025,574	12,516,748	3,160,110	14,478,536	1,111,811	1,355,677
1909.....	5,625,063	11,455,818	3,017,844	13,906,152	1,230,017	1,469,889
1910.....	a 5,966,466	11,919,341	b 3,266,235	14,735,062	c 1,365,281	1,795,598

(a). Duty, 53c. per ton. (b) Coal, anthracite, and anthracite coal dust; duty free. (c). Duty 14c. per ton.

†In the anthracite column the imports show a very considerable increase in 1888 over 1887, an increase of over 94 per cent, the falling off again in 1889 being quite as remarkable. The average values per ton for the three years 1887, 1888, and 1889, were \$4.02, \$2.47, and \$4.03 respectively. Although a duty of 50c. per ton on anthracite coal was removed May 13, 1887, it is hardly thought this would account for the changes indicated, and unless some error may possibly have crept into the Trade and Navigation report, no explanation is available.



The total consumption of coal in Canada during 1910, deduced from the records of production, exports and imports, was 20,970,226 tons, as compared with 18,625,202 tons in 1909; an increase of 2,345,024 tons or 12·6 per cent. Of the total consumption during the past year 10,532,103 tons or 50·2 per cent was domestic coal and 10,438,123 imported coal.

The per capita consumption in 1910, based on an estimate of the population made by the Census Office, was approximately 2·800 tons. This is larger than the per capita consumption during 1909, but less than the per capita consumption during the two preceding years. The consumption in Canada is still small when compared with that of the United States, where the production has reached a total of about 5 tons per capita.

### Consumption of Coal in Canada, 1909-10.

	1909.		1910.	
	Tons.	Tons.	Tons.	Tons.
Production, Table 3.....	10,501,475	.....	12,909,152	.....
Exports of Canada, Table 4.....	1,588,099	.....	2,377,049	.....
Home consumption of Canadian coal.....	.....	8,913,376	.....	10,532,103
Imports, Table 6.....	9,872,924	.....	10,597,982	.....
Exports not produce of Canada, Table 4.....	161,098	.....	159,859	.....
Canadian consumption of imported coal.....	.....	9,711,826	.....	10,438,123
Total consumption of coal in Canada.....	.....	18,625,202	.....	20,970,226

### COAL.—TABLE 7.

### Consumption of Coal in Canada, 1886-1910.

Calendar Year.	Canadian.	Imported.	Total.	Percentage Canadian.	Percentage Imported.	Consumption per capita.
	Tons.	Tons.	Tons.			Tons.
1886.....	1,595,950	1,884,161	3,480,111	45·9	54·1	0·758
1887.....	1,848,365	2,192,260	4,040,625	45·7	54·3	0·871
1888.....	2,013,925	3,314,353	5,328,278	37·8	62·2	1·137
1889.....	1,992,988	2,490,931	4,483,919	44·4	55·6	0·946
1890.....	2,360,196	2,581,187	4,941,383	47·8	52·2	1·031
1891.....	2,606,490	2,980,222	5,586,712	46·7	53·3	1·153
1892.....	2,464,012	3,082,429	5,546,441	44·4	55·6	1·133
1893.....	2,823,187	3,110,462	5,933,649	47·6	52·4	1·198
1894.....	2,743,376	2,917,818	5,661,194	48·5	51·5	1·130
1895.....	2,467,109	2,933,752	5,400,861	45·7	54·3	1·066
1896.....	2,639,055	3,206,456	5,845,511	45·1	54·9	1·140
1897.....	2,799,977	3,124,485	5,924,462	47·3	52·7	1·143
1898.....	3,023,079	3,274,981	6,298,060	48·0	52·0	1·200
1899.....	3,631,882	4,092,361	7,724,243	47·0	53·0	1·454
1900.....	3,989,542	4,361,563	8,351,105	47·8	52·2	1·561
1901.....	4,912,664	4,810,213	9,722,877	50·5	49·5	1·810
1902.....	5,376,413	5,165,938	10,542,351	51·0	49·0	1·927
1903.....	6,005,735	5,491,870	11,507,605	52·2	47·8	2·055
1904.....	6,697,183	6,909,651	13,606,834	49·2	50·8	2·346
1905.....	7,032,661	7,343,880	14,376,541	48·9	51·1	2·396
1906.....	7,927,560	7,398,906	15,326,466	51·7	48·3	2·425
1907.....	8,617,352	10,549,503	19,166,855	45·0	55·0	2·946
1908.....	9,156,478	10,195,424	19,351,902	47·3	52·7	2·826
1909.....	8,913,376	9,711,826	18,625,202	47·9	52·1	2·599
1910.....	10,532,103	10,438,123	20,970,226	50·2	49·8	2·800

**Nova Scotia.**

The production of coal in Nova Scotia during 1910 was reported as 6,431,142 tons as compared with a production of 5,652,089 tons in 1909, showing an increase of 779,053 tons or about 14 per cent. This increase, however, was not sufficient to place the production as high as that recorded for 1908, when the production was 6,652,539 tons. The falling off of 1,000,450 tons in 1909 was probably due in part to the coal miners strike at Sydney, Inverness, and Cumberland which took place in July and August of that year and continued through the first few months of 1910. During the first five months of 1909, however, the demand for coal was apparently much less than during the corresponding period of 1908, as evidenced by the falling off in shipments from nearly all collieries during that period.

The yearly production of coal in this Province has not shown any great change during the past five years with the exception of that just noted for 1909. The average yearly production during this period was 6,262,081 tons.

Of the production in 1910 the quantity sold for consumption in Canada was reported as 5,003,933 tons, while 356,089 tons were reported as sold for export to the United States and 223,748 tons sold for export to other countries; 663,812 tons were used by colliery consumption and by workmen, and 183,560 tons were used by colliery operators in making coke. Some of the coal sold for consumption in Canada was also used in making coke, the total tonnage used for coke making being 756,003 tons.

Annual statistics of the output, sales, colliery consumption, and production since 1872 are shown in Table 8, the figures being given in both long and short tons; the production by counties during the past five years is shown in Table 9. The record in each case covers the calendar year. Of the total output in 1910 about 77.3 per cent was mined in Cape Breton county, 11 per cent in Pictou county, 5.4 per cent in Cumberland county, and 6.3 per cent in Inverness and other counties.

The Provincial Department of Mines in this Province collects and publishes statistics of coal production covering the fiscal year ending September 30.

The details of colliery output during the year ending September 30, 1910, as published in the Provincial Mines Report, are shown below; while the colliery output during the last three fiscal years is shown in Table 10 and the distribution of coal sold during the same periods in Table 11.

## Nova Scotia: Output, Sales, Colliery Consumption, and Production.

Calendar Year.	Output, Tons, 2,240 lbs.	Sold or used, Tons, 2,240 lbs.	Colliery Consump- tion, Tons, 2,240 lbs.	Production,* Tons, 2,240 lbs.	Output, Tons, 2,000 lbs.	Sold or used, Tons, 2,000 lbs.	Colliery Consump- tion, Tons, 2,000 lbs.	Production,* Tons, 2,000 lbs.	Price per Ton, 2,240 lbs.	Value of Production. \$
1872.....	880,950	785,914	110,341	806,255	986,864	880,224	123,582	1,003,806	\$ 1.75	1,568,446
1873.....	1,051,467	881,106	108,598	989,504	1,177,643	986,839	121,406	1,003,806	1.75	1,731,632
1874.....	782,120	749,127	119,582	868,709	977,446	839,022	133,932	972,954	1.75	1,520,240
1875.....	781,165	706,795	124,110	830,905	874,905	791,610	139,003	930,613	1.75	1,454,084
1876.....	709,646	634,207	113,788	747,995	794,804	710,312	127,443	837,755	1.75	1,308,991
1877.....	757,496	687,065	98,841	785,906	848,396	769,513	110,702	880,215	1.75	1,375,339
1878.....	770,603	693,511	86,627	782,138	863,075	776,732	99,262	875,994	1.75	1,368,741
1879.....	788,271	688,624	84,787	773,411	882,863	771,259	94,961	866,220	1.75	1,353,460
1880.....	1,032,710	954,659	96,831	1,051,490	1,156,635	1,069,218	108,451	1,777,669	1.75	1,840,108
1881.....	1,124,270	1,035,014	107,888	1,142,902	1,259,183	1,159,216	120,834	1,280,050	1.75	2,000,079
1882.....	1,365,811	1,250,179	111,381	1,361,560	1,529,708	1,400,200	124,747	1,524,947	1.75	2,382,730
1883.....	1,422,553	1,297,523	111,949	1,409,472	1,503,259	1,453,226	125,383	1,578,609	1.75	2,466,576
1884.....	1,389,295	1,261,650	116,769	1,378,419	1,556,011	1,413,048	130,781	1,543,829	1.75	2,412,233
1885.....	1,352,205	1,254,510	127,624	1,352,134	1,514,470	1,405,051	142,939	1,547,900	1.75	2,418,735
1886.....	1,502,611	1,373,666	142,421	1,516,087	1,682,824	1,588,506	159,512	1,698,018	1.75	2,653,152
1887.....	1,670,830	1,519,684	139,777	1,659,461	1,871,330	1,702,046	156,550	1,898,596	1.75	2,904,057
1888.....	1,776,128	1,576,692	157,443	1,734,135	1,989,263	1,765,895	176,336	1,942,231	1.75	3,034,735
1889.....	1,756,279	1,555,107	158,131	1,713,238	1,967,032	1,741,720	177,107	1,918,827	1.75	2,998,167
1890.....	1,984,001	1,786,111	161,240	1,947,351	2,222,081	2,000,444	180,589	2,181,033	1.75	3,407,864
1891.....	2,044,784	1,849,945	174,983	2,024,928	2,290,158	2,071,938	195,981	2,267,919	1.75	3,543,624
1892.....	2,042,780	1,752,934	175,092	1,928,096	2,175,913	1,963,286	196,103	2,159,380	1.75	3,374,046
1893.....	2,223,042	1,977,543	205,425	2,182,968	2,489,807	2,214,848	230,076	2,444,924	1.75	3,820,194
1894.....	2,250,631	2,060,920	196,206	2,257,126	2,520,707	2,308,231	219,751	2,527,982	1.75	3,949,970
1895.....	1,999,756	1,793,098	193,639	1,986,737	2,239,727	2,008,270	216,875	2,225,145	1.75	3,476,790
1896.....	2,292,675	2,046,828	192,975	2,239,808	2,537,706	2,202,447	216,132	2,508,570	1.75	3,919,355
1897.....	2,340,031	2,044,672	181,716	2,226,388	2,020,835	2,290,032	203,522	2,403,554	1.75	3,806,170
1898.....	2,262,656	2,121,126	187,428	2,288,554	2,584,175	2,375,661	187,519	2,563,180	1.75	4,004,970
1899.....	2,865,443	2,633,989	177,460	2,811,449	3,209,296	2,950,067	138,775	3,148,822	2.00	5,622,808
1900.....	3,298,791	2,998,737	236,563	3,235,300	3,694,646	3,388,585	284,051	3,623,536	2.50	8,088,260
1901.....	3,821,033	3,411,127	301,434	3,712,561	4,279,557	3,820,462	337,606	4,158,008	1.75	6,496,982

\*This production is obtained by adding sales and colliery consumption.  
Table continued on page 14.

COAL.—TABLE 8—Continued.  
Nova Scotia. Output, Sales, Colliery Consumption, and Production.

Calendar Year.	Output, Tons, 2,240 lbs.	Sold or used, Tons, 2,240 lbs.	Colliery Consump- tion, Tons, 2,240 lbs.	Production,* Tons, 2,240 lbs.	Output, Tons, 2,000 lbs.	Sold or used, Tons, 2,000 lbs.	Colliery Consump- tion, Tons, 2,000 lbs.	Production,* Tons, 2,000 lbs.	Price per Ton, 2,240 lbs.	Value of Production.
									\$ cts.	\$
1902.....	4,725,480	4,229,120	379,198	4,608,318	5,292,538	4,736,614	424,702	5,161,316	2 00	9,216,636
1903.....	5,215,562	4,565,720	481,903	5,047,623	5,841,429	5,113,607	539,731	5,653,338	2 00	10,095,246
1904.....	5,131,985	4,551,740	144,904	4,996,644	5,747,823	5,097,949	498,292	5,896,241	2 00	9,993,288
1905.....	5,197,877	4,613,818	427,774	5,041,592	5,821,622	5,167,476	479,107	5,646,583	2 00	10,083,184
1906.....	5,844,813	5,093,131	460,891	5,554,022	6,546,191	5,704,307	516,198	6,220,505	2 00	11,108,044
1907.....	5,775,503	5,236,077	437,256	5,673,333	6,468,563	5,864,406	489,727	6,354,133	2 25	12,764,999
1908.....	6,076,350	5,224,787	576,509	5,939,767	6,805,489	5,851,761	645,690	6,652,539	2 25	13,364,476
1909.....	5,106,135	4,524,029	522,479	5,046,508	5,718,871	5,066,912	585,177	5,652,089	2 25	11,354,643
1910.....	5,817,109	5,149,402	592,689	5,742,091	6,515,162	5,767,330	663,812	6,431,142	2 25	12,919,705

\*This production is obtained by adding sales and colliery consumption.



COAL.—TABLE 9.  
Nova Scotia: Coal trade by Counties, Calendar Years 1906-10.

Calendar Year.	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sales.*	Raised.	Sales.*	Raised.	Sales.*	Raised.	Sales.*	Raised.	Sales.*
1906.....	659,734	566,308	769,496	657,310	4,804,407	4,221,293	312,554	259,396	6,546,191	5,704,307
1907.....	534,047	445,288	840,533	729,043	4,698,147	4,346,180	395,836	343,895	6,468,563	5,864,406
1908.....	662,157	530,648	849,802	678,025	4,840,653	4,267,346	452,877	375,742	6,805,489	5,851,761
1909.....	494,919	403,371	743,860	599,743	4,081,333	3,723,135	398,759	340,663	5,718,871	5,066,912
1910. . .	350,363	288,706	714,846	588,678	5,035,800	4,571,347	414,153	374,950	6,515,162	5,823,681

\*Includes coal used for making coke.



Colliery.	1908. Tons of 2,000 lbs.	1909. Tons of 2,000 lbs.	1910. Tons of 2,000 lbs.
<i>Cape Breton County.</i>			
Dominion Coal Company.....	4,274,993	3,119,556	3,634,124
Nova Scotia Steel and Coal Co.....	741,832	848,444	936,710
North Atlantic Collieries.....	65,830	81,292	99,687
McKay Mining Company.....	15,187	15,217	19,136
Sydney Coal Company.....	5,377	5,301	4,464
Colonial Mining Co.....		709	15,625
<i>Cumberland County.</i>			
Cumberland Railway and Coal Co.....	466,068	421,437	60,298
Maritime Coal, Railway, and Power Co., Chignecto.....	17,740	56,392	181,264
“ “ “ Joggins.....	57,266	55,620	
Minudie Coal Co.....	54,205	55,766	61,037
Stratheona Coal Co.....	26,799	7,936	
Great Northern Coal Co.....	3,053	4,272	988
Atlantic Grindstone and Coal Co.....	964	721	239
Eastern Coal Co.....		4,940	7,331
<i>Colchester County.</i>			
Colchester Coal Co.....	4,425	1,490	
<i>Pictou County.</i>			
Acadia Coal Co.....	463,436	408,792	397,962
Intercolonial Coal Co.....	353,461	327,576	307,692
Marsh colliery.....	53,586	22,585	
<i>Inverness County.</i>			
Inverness Coal and Railway Co.....	317,748	296,546	310,528
Mabou Coal Co.....	21,560	1,804	
Port Hood Coal Co.....	111,664	107,669	97,269

## COAL.—TABLE II.

## Nova Scotia: Distribution of Coal Sold.

FISCAL YEARS ENDING SEPTEMBER 30.						
Markets.	1907.		1908.		1909.	
	Tons of 2,000 lbs.	Per cent.	Tons of 2,000 lbs.	Per cent.	Tons of 2,000 lbs.	Per cent.
Nova Scotia—						
Transported by land.....	1,740,736	30.80	1,804,377	29.37	1,642,716	31.77
“ “ sea.....	322,773	5.71	380,332	6.19	339,462	6.57
Total Nova Scotia.....	2,063,509	36.51	2,184,709	35.56	1,982,178	38.34
New Brunswick.....	478,383	8.46	571,570	9.30	607,968	11.76
Prince Edward Island.....	86,792	1.54	70,931	1.15	88,365	1.71
Quebec Province.....	1,914,743	33.88	2,293,352	37.33	1,689,876	32.69
Newfoundland.....	164,082	2.90	231,909	3.77	174,998	3.39
United States.....	690,269	12.21	559,592	9.11	359,224	6.95
West Indies.....	2,910	0.05	.....	.....	.....	.....
Mexico.....	8,502	0.15	.....	.....	.....	.....
St. Pierre.....	.....	.....	9,976	0.16	11,463	0.22
Bunker coal.....	229,121	4.05	216,554	3.53	254,681	4.92
Other countries.....	13,981	0.25	5,261	0.09	846	0.02
Totals.....	5,652,292	100.00	6,143,854	100.00	5,169,599	100.00
					5,484,524	100.00

Nova Scotia—

Transported by land.....

“ “

sea.....

Total Nova Scotia.....

New Brunswick.....

Prince Edward Island.....

Quebec Province.....

Newfoundland.....

United States.....

West Indies.....

Mexico.....

St. Pierre.....

Bunker coal.....

Other countries.....

Totals.....

## New Brunswick.

The coal production in New Brunswick is derived from the Grand Lake coal-field, in Queens county, where a comparatively large number of small mines are intermittently operated. Only about 50 per cent of the production has been directly reported by the producers.

The actual shipments during 1910 are estimated by the provincial Department of Works at 53,455 tons. Adding 2,000 tons for colliery consumption, workmen, etc., the production is placed at 55,455 tons, a slight increase over the production of 1909.

COAL.—TABLE 12.

## New Brunswick: Production.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
		\$	\$ cts.			\$	\$ cts.
1887.....	10,040	23,607	2 35	1899.....	10,528	15,792	1 50
1888.....	5,730	11,050	1 93	1900.....	10,000	15,000	1 50
1889.....	5,673	11,733	2 07	1901.....	17,630	51,857	2 94
1890.....	7,110	13,850	1 95	1902.....	18,795	39,680	2 11
1891.....	5,422	11,030	2 03	1903.....	16,000	40,000	2 50
1892.....	6,768	9,375	1 39	1904.....	9,112	18,224	2 00
1893.....	6,200	9,837	1 59	1905.....	29,400	58,800	2 00
1894.....	6,469	10,264	1 59	1906.....	34,076	68,152	2 00
1895.....	9,500	14,250	1 50	1907.....	34,584	77,814	2 25
1896.....	7,500	11,250	1 50	1908.....	60,000	135,000	2 25
1897.....	6,000	9,000	1 50	1909.....	49,029	98,496	2 25
1898.....	6,160	9,240	1 50	1910.....	55,455	110,910	2 00

## Saskatchewan.

Returns were recorded from 12 separate collieries in this Province during 1910, showing a total production of 181,156 tons valued at \$293,923; a slight decrease from the production reported for 1909.

Of the 1910 production 173,084 tons were sold for consumption in Canada and 8,072 tons used by the producers for colliery consumption and workmen.

The output is obtained entirely from the Estevan and Souris fields in the southern portion of the Province and is used mainly for domestic purposes in Saskatchewan and Manitoba.

Statistics of production since 1890 are given in Table 13:—

## COAL.—TABLE 13.

## Saskatchewan: Annual Production.

Calendar Year.	Tons.	Value.	Average value per ton.	Calendar Year.	Tons.	Value.	Average value per ton.
		\$	\$ cts.			\$	\$ cts.
1890.....	200	200	1 00	1901.....	45,000	72,000	1 60
1891.....				1902.....	70,400	112,640	1 52
1892.....	5,400	9,325	1 73	1903.....	116,703	169,618	1 45
1893.....	8,325	12,485	1 50	1904.....	124,885	187,021	1 50
1894.....	†15,051	15,153	1 01	1905.....	107,596	152,334	1 42
1895.....	15,769	31,538	2 00	1906.....	108,398	164,146	1 51
1896.....	16,706	25,059	1 50	1907.....	151,232	252,437	1 67
1897.....	25,000	37,500	1 50	1908.....	150,556	253,790	1 69
1898.....	25,000	37,500	1 50	1909.....	192,125	296,339	1 54
1899.....	25,000	37,500	1 50	1910.....	181,156	293,923	1 62
1900.....	40,500	60,750	1 50				

† Including a small quantity from the Turtle Mountain district, Manitoba.

## Alberta.

The production of marketable coal in Alberta in 1910, according to direct returns received from the operators, supplemented in several instances by information kindly furnished by the Provincial Inspector of Mines, was 2,894,469 tons valued at \$7,065,736, an average of \$2.44 per ton; showing an increase of 899,728 tons or 45 per cent over the 1909 production. Of the total production in 1910, 2,309,438 tons were sold for consumption in Canada; 243,371 tons for export to the United States. The producers used 145,410 tons for colliery consumption and for workmen and 196,250 tons were used in making coke. The railways use a very large portion of the coal production in this Province, having taken in 1909 upwards of 45.7 per cent of the total sold for consumption in Canada. In 1910 the Canadian Pacific railway alone took for the Company's use over 46 per cent of the total Alberta tonnage sold for consumption in Canada.

## COAL.—TABLE 14.

## Alberta: Annual Production.

Calendar Year.	Tons	Value.	Average value per ton.	Calendar Year.	Tons.	Value.	Average value per ton.
		\$	\$ cts.			\$	\$ cts.
1887.....	74,152	157,577	2 13	1899.....	309,600	774,000	2 50
1888.....	115,124	183,354	1 59	1900.....	311,450	778,625	2 50
1889.....	97,364	179,640	1 85	1901.....	340,275	850,687	2 50
1890.....	128,753	198,298	1 54	1902.....	402,819	960,601	2 38
1891.....	174,131	437,243	2 51	1903.....	495,893	1,117,541	2 25
1892.....	178,970	460,605	2 57	1904.....	661,732	1,404,524	2 12
1893.....	230,070	586,260	2 55	1905.....	931,917	1,993,915	2 14
1894.....	184,940	473,827	2 56	1906.....	1,246,360	2,614,762	2 10
1895.....	169,885	382,526	2 25	1907.....	1,591,579	3,836,286	2 41
1896.....	209,162	581,832	2 78	1908.....	1,685,661	4,127,311	2 45
1897.....	242,163	630,408	2 60	1909.....	1,994,741	4,838,109	2 43
1898.....	315,088	788,720	2 50	1910.....	2,894,469	7,065,736	2 44

About 8 per cent of the production in Alberta is anthracite coal, the balance being bituminous and lignite. The only operating anthracite mine at present is the Bankhead mine at Banff.

The anthracite is very carefully prepared and sized for the market and in its preparation much dust is produced; a part of this dust is manufactured into briquettes which find a ready market for domestic use.

The statistics of production of coal in Alberta as collected by the Provincial Inspector of Mines show a somewhat larger output than that given above. According to this authority the total coal output in 1910 was 3,036,757 tons. The distribution of coal sold and used was as follows:—

### Classification and Distribution of Coal Output of Alberta during the Year 1910.

Class.	SOLD FOR CONSUMPTION IN			Used for making coke	Used under colliery boilers.	Total sold or used.
	Alberta.	Other Provinces.	United States.			
Bituminous.....	1,291,721	124,274	215,976	196,249	170,465	2,975,595
Lignite.....	438,781	317,959	27,397	.....		
Anthracite.....	40,091	43,110	758	.....		
Briquettes.....	89,383	19,387	44	.....		
	1,859,976	504,730	244,175	196,249	170,465	2,975,595



The annual production of anthracite since 1901 according to the published records of the Provincial Inspector of Mines has been as follows:—

### Production of Anthracite in Alberta.

1901.....	14,742 Tons.	1906.....	235,597 Tons.
1902.....	16,587 "	1907.....	256,115 "
1903.....	5,185 "	1908.....	249,095 "
1904.....	23,363 "	1909.....	213,257 "
1905.....	43,653 "		

### British Columbia.

The total production of coal in British Columbia during 1910, including only marketable coal sold or used, was 3,330,745 tons valued at \$10,408,580, as compared with a production of 2,606,127 tons valued at \$8,144,147 produced in 1909; showing an increase of 724,618 tons, or nearly 28 per cent.

Of the total production in 1910, 1,400,405 tons or 42 per cent were sold for consumption in Canada, as compared with 1,096,935 tons or 42.1 per cent similarly disposed of in 1909; 1,248,483 tons or 37.5 per cent were sold for export to the United States in 1910, as against 759,537 tons or 29.1 per cent in 1909; and 67,525 tons were sold for export to other countries, as against 71,130 tons in 1909. The quantity used by producers in making coke in 1910 was 379,893 tons or 11.4 per cent of the production, as against 439,290 tons or 16.9 per cent in 1909; and the quantity used by producers under colliery boilers and for workmen in 1910 was 234,439 tons, as against 239,235 tons in the previous year.

There were also mined in 1910, but not included as production, 39,389 tons of coal added to stock at the close of the year and 160,337 tons of 'waste' coal lost chiefly in washing.

The collieries of the Crow's Nest Pass Coal Company in East Kootenay, the Western Fuel Company and The Canadian Collieries (Dunsmuir) Ltd., formerly the Wellington Colliery Co.—on Vancouver island, contributed about 70.6 per cent of the total production, which was almost equally divided between the Vancouver Island collieries and those of the Crowsnest pass and the central portion of the Province. The production of the island and mainland collieries is separately shown in the following table:—

Coal.	1909.			1910.		
	Coast.	Crowsnest and Nicola valley.	Total.	Coast.	Crowsnest and Nicola valley.	Total.
		Short Tons			Short Tons	
Sold for consumption in Canada.....	874,918	222,016	1,096,934	1,015,821	384,584	1,400,405
Sold for export to United States.....	363,696	395,842	759,538	403,370	845,113	1,248,483
Sold for export to other countries.....	71,130	.....	71,130	67,525	.....	67,525
Total Sales.....	1,309,744	617,858	1,927,602	1,486,716	1,229,697	2,716,413
Used for making coke.....	29,971	409,319	439,290	5,230	374,662	379,892
Used for colliery consump- tion.....	79,100	160,135	239,235	135,864	98,576	234,440
Production.....	1,418,815	1,187,312	2,606,127	1,627,810	1,702,935	3,330,745

In Table 15 the statistics of coal production in British Columbia since 1836 are given. The total production to the end of 1910 has been 40,106,909 tons (2,000 lbs.) of which 21,994,327 tons or 54.8 per cent have been produced during the past ten years.

## COAL.—TABLE 15.

## British Columbia: Production.

Calendar Year.	Output, Tons, 2,240 lbs.	Home Consumption, Tons, 2,240 lbs.	Sold for Export, 2,240 lbs.	PRODUCTION.*		Price per ton, 2,240 lbs.	Value.
				Tons, 2,240 lbs.	Tons, 2,000 lbs.		
1836-52.....	10,000				11,200	4 00	40,000
1852-59.....	25,398				28,446	4 00	101,592
1859†.....	1,989				2,228	4 00	7,956
1860.....	14,247				15,957	4 00	56,988
1861.....	13,774				15,427	4 00	55,096
1862.....	18,118				20,292	4 00	72,472
1863.....	21,345				23,906	4 00	85,380
1864.....	28,632				32,068	4 00	114,528
1865.....	32,819	From 1836 to 1873, inclusive, the output is taken as production.			36,757	4 00	131,276
1866.....	25,115				28,129	4 00	100,460
1867.....	31,239				34,988	4 00	124,956
1868.....	44,005				49,286	4 00	176,020
1869.....	35,080				40,098	4 00	143,208
1870.....	29,843				33,424	4 00	119,372
1871-2-3.....	148,459				166,274	4 00	593,836
1874.....	81,547	25,023	56,038	81,061	90,788	3 00	243,133
1875.....	110,145	31,252	66,392	97,644	109,361	3 00	292,932
1876.....	139,192	17,856	†122,329	140,185	157,007	3 00	420,555
1877.....	154,052	24,311	115,381	139,692	156,455	3 00	419,076
1878.....	170,846	26,166	164,682	190,848	213,750	3 00	572,544
1879.....	241,301	40,294	192,096	232,390	260,277	3 00	697,170
1880.....	267,595	46,513	225,849	272,362	305,045	3 00	817,086
1881.....	228,357	40,191	189,323	229,514	257,056	3 00	688,542
1882.....	282,139	56,161	232,411	288,572	323,201	3 00	865,716
1883.....	213,299	64,786	149,567	214,353	240,075	3 00	643,059
1884.....	394,070	87,388	306,478	393,866	441,130	3 00	1,181,598
1885.....	365,596	95,227	237,797	333,024	372,987	3 00	999,072
1886.....	326,636	85,987	249,205	335,192	375,415	3 00	1,005,576
1887.....	413,360	99,216	334,839	434,055	486,142	3 00	1,302,165
1888.....	489,301	115,953	365,714	481,667	539,467	3 00	1,445,001
1889.....	579,830	124,574	443,675	568,249	636,439	3 00	1,704,747
1890.....	678,140	177,075	503,270	685,345	767,586	3 00	2,056,035
1891.....	1,029,097	202,697	806,479	1,009,176	1,130,277	3 00	3,027,528
1892.....	826,335	196,223	640,579	836,802	937,218	3 00	2,510,406
1893.....	978,294	207,851	768,917	976,768	1,093,980	3 00	2,930,304
1894.....	1,012,953	165,776	827,642	993,418	1,112,628	3 00	2,980,254
1895.....	939,654	188,349	756,334	944,683	1,058,045	3 00	2,834,049
1896.....	894,882	261,984	634,238	896,222	1,003,769	3 00	2,688,666
1897.....	802,296	290,310	619,860	910,170	1,019,390	3 00	2,730,510
1898.....	1,136,485	375,423	752,863	1,128,286	1,263,680	3 00	3,384,858
1899.....	1,306,324	526,058	751,711	1,277,769	1,431,101	3 00	3,833,307
1900.....	1,590,178	685,667	914,184	1,599,851	1,791,833	3 00	4,799,553
1901.....	1,691,557	799,666	914,163	1,713,829	1,919,488	3 00	5,141,487
1902.....	1,641,626	837,871	776,809	1,614,680	1,808,441	3 00	4,844,040
1903.....	1,450,663	947,499	549,449	1,496,948	1,676,531	3 00	4,490,844
1904.....	1,685,698	1,129,465	533,593	1,663,058	1,862,625	3 00	4,989,174
1905.....	1,736,696	1,089,667	647,343	1,737,010	1,945,452	3 00	5,211,030
1906.....	1,899,076	1,236,476	679,829	1,916,305	2,146,262	3 00	5,748,915
1907.....	2,219,602	1,438,402	673,114	2,111,516	2,364,898	3 50	7,390,306
1908.....	2,111,931	1,486,511	597,157	2,083,668	2,333,703	3 50	7,292,838
1909.....	2,388,196	1,585,232	741,667	2,326,899	2,606,127	3 50	8,144,147
1910.....	3,152,207	1,798,873	1,175,007	2,973,880	3,330,745	3 50	10,408,580

\*This production is obtained by adding 'Home Consumption' and 'Sold for Export'.

‡52,935 tons of this amount were exported as sales without the division into 'Home Consumption and 'Sold for Export'.

†Two months only.

Complete statistics of the production of each colliery have been published by the British Columbia Bureau of Mines, from which the following has been compiled:—

## Coal Production by Collieries in British Columbia in 1910, in tons of 2,240 lbs.

Colliery.	SALES.			Used in Making Coke.	Used under Colliery Boilers, etc.	Lost in Washing.	STOCKS.		Output.
	In Canada.	To United States.	To Other Countries.				First of Year.	Last of Year.	
1. Protection.....	187,923	133,360	10,583	.....	31,439	.....	8,327	9,711	364,689
2. Northfield.....	36,035	77,776	6,535	.....	28,495	.....	2,605	1,945	148,181
3. Extension.....	251,208	72,920	.....	.....	12,467	43,812	1,906	1,881	380,482
4. Union.....	308,266	48,623	25,873	.....	37,355	79,790	6,986	20,835	518,426
5. Fiddick.....	92,701	27,473	17,299	.....	10,305	11,602	13,238	25,829	171,971
6. Suquash.....	766	.....	.....	.....	1,000	.....	1,050	2,123	2,839
7. New East Wallington.....	29,542	.....	.....	.....	.....	.....	200	100	29,442
8. Middlesboro.....	138,681	.....	.....	.....	2,987	.....	440	259	141,487
9. Princeton.....	6,278	3,570	.....	.....	300	.....	.....	11,720	11,868
10. Coal Creek.....	41,110	431,772	.....	.....	29,756	.....	36	1,530	622,564
11. Michel.....	77,290	204,525	.....	.....	147,134	.....	27	159	457,581
Carbonado.....	*	*	*	*	*	*	*	*	*
12. Hosmer.....	54,098	.....	.....	.....	68,953	.....	1,475	3,388	158,123
13. Corbin.....	10,080	114,790	.....	.....	1,981	11,073	.....	.....	126,581
14. Diamond Vale.....	2,261	.....	.....	.....	100	.....	.....	70	2,431
15. Coal Hill.....	2,200	.....	.....	.....	100	.....	.....	.....	2,300
	1,238,439	1,114,809	60,290	339,189	206,871	146,277	36,290	69,650	3,139,235

\*Not in operation. †Development coal not marketed.

1. The Western Fuel Co.
2. The Canadian Collieries (Dunsmuir), Ltd.
3. Pacific Coast Coal Mines, Ltd.
4. The Vancouver-Nanaimo Coal Mining Co., Ltd.
5. Nicola Valley Coal and Coke Co., Ltd.
6. Princeton Coal and Land Co., Ltd.
7. Crow's Nest Pass Coal Co., Ltd.
8. Hosmer Mines, Ltd.
9. Corbin Coal and Coke Co., Ltd.
10. Diamond Vale Collieries, Ltd.
11. Coal Hill Syndicate.

**Yukon.**

The coal production in the Yukon in 1910 was reported as 16,185 tons valued at the mine at \$110,925, as compared with a production of 7,364 tons valued at \$49,502 in 1909. Active mining operations were carried on only by the Five Fingers Coal Co. at Tantalus, in the southern Yukon, and by the Northern Light, Power, and Coal Co., Ltd., operating the Sourdough mine on Coal creek, 40 miles northwest of Dawson.

Statistics of production from 1901 are shown in Table 16 following:—

COAL.—TABLE 16.

**Yukon Territory: Annual Production.**

Calendar Year.	Tons.	Value.	Average value per ton.
		\$	\$ cts.
1901.....	†5,864	86,230	14 70
1902.....	4,910	37,280	7 59
1903.....	1,849	29,584	16 00
1904.....			
1905.....	7,000	21,000	3 00
1906.....	7,000	28,000	4 00
1907.....	15,000	60,000	4 00
1908.....	3,847	21,158	5 50
1909.....	7,364	49,502	6 72
1910.....	16,185	110,925	6 85

†Part of this production was mined in 1900.



## COKE.

The statistics of coke production given herewith do not include coke made as a by-product in the manufacture of illuminating gas but are restricted to the record of the output of 'oven coke' produced chiefly for metallurgical purposes.

The total output of coke in 1910 was 901,269 tons produced from 1,373,793 tons of coal: of which 875,310 tons were produced from domestic coal and 25,959 tons from imported coal.

In 1909 the total production was 871,727 tons produced from 1,327,150 tons of coal.

The quantity of coke sold or used by the producers in 1910 was 902,715 tons, as compared with 862,011 tons in 1909.

The consumption of coke in Canada is much in excess of the domestic production, there being a considerable importation of coke chiefly into Ontario and Quebec for use in the metallurgical industries.

The imports of coke during the calendar year 1910 were 737,088 tons and the exports 57,971. These figures taken in conjunction with the production of 902,715 tons (sold or used), would indicate a consumption of 1,581,832 tons. Similarly estimated the consumption in 1909 was 1,449,369 tons and in 1908 1,285,228 tons.

The production by provinces in 1909 and 1910 and the distribution of coke sold or used in 1910 are shown in the next three tables.

### Coke Production, 1909.

Province.	Coal charged to Ovens.	Output of Coke.	STOCK ON HAND.		Coke sold or used.	Value of Sales, etc.
			Jan. 1.	Dec. 31.		
	Tons.	Tons.	Tons.	Tons.	Tons.	\$
Nova Scotia.....	756,719	493,184	209	401	492,992	1,608,092
Alberta.....	131,142	87,812	750	1,329	87,233	366,734
British Columbia.....	439,289	290,731	10,170	19,115	281,786	1,509,567
Totals.....	1,327,150	871,727	11,129	20,845	862,011	3,484,393

### Coke Production, 1910.

Nova Scotia.....	756,003	508,025	417	384	508,058	1,655,775
Ontario.....	42,208	25,959	.....	1,274	24,685	148,110
Alberta.....	196,250	123,093	40	1,555	121,578	486,312
British Columbia.....	379,332	244,192	18,759	14,557	248,344	1,172,675
Totals.....	1,373,793	901,269	19,216	17,770	902,715	3,462,872

## Distribution of Coke Production, 1910.

	Nova Scotia.	Ontario.	Alberta.	British Columbia.	Total.
Sold in Canada.....	8,341		70,434	229,541	308,316
Sold for export.....			51,144	9,778	60,922
Total sales.....	8,341		121,578	239,319	369,238
Used by maker in blast furnace or otherwise.....	499,717	24,685		9,075	533,477
Total sold or used.....	508,058	24,685	121,578	248,394	902,715
Number of ovens in operation De- cember 31.....	654	96	266	662	1,678
Number of ovens idle December 31.....	174	4		908	1,086
Number of ovens building De- cember 31.....	120	110			230

The annual production of coke since 1886 is shown in Table 1 and the annual production by provinces since 1897, in Table 2.

COKE.—TABLE 1.

## Annual Production, 1886-1910.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value. per ton.
		\$	\$ cts.			\$	\$ cts.
1886.....	35,396	101,940	2 88	1899.....	100,820	350,022	3 47
1887.....	40,428	135,951	3 36	1900.....	157,134	649,140	4 13
1888.....	45,373	134,181	2 96	1901.....	365,531	1,228,225	3 36
1889.....	54,539	155,043	2 84	1902.....	502,043	1,519,185	3 03
1890.....	56,450	166,298	2 95	1903.....	561,318	1,734,404	3 09
1891.....	57,084	175,592	3 08	1904.....	554,083	2,032,048	3 66
1892.....	56,135	160,249	2 85	1905.....	700,488	2,436,211	3 48
1893.....	61,078	161,790	2 65	1906.....	782,055	2,863,503	3 66
1894.....	58,044	148,551	2 56	1907.....	842,003	3,583,468	4 26
1895.....	53,356	143,047	2 68	1908.....	858,257	3,449,361	4 02
1896.....	49,619	110,257	2 22	1909.....	862,011	3,484,393	4 04
1897.....	60,686	176,457	2 91	1910.....	902,715	3,462,872	3 84
1898.....	87,600	286,000	3 26				

COKE.—TABLE 2.

## Production of Coke by Provinces, 1897-1910.

Calendar Year.	NOVA SCOTIA.		ONTARIO.		BRITISH COLUMBIA		ALBERTA.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$		\$
1897.....	41,532	90,950			19,154	85,507		
1898.....	48,400	111,000			39,200	175,000		
1899.....	62,459	178,767			38,361	171,255		
1900.....	61,767	223,395			95,367	425,745		
1901.....	222,694	590,560			142,837	637,665		
1902.....	363,330	899,930			138,713	619,255		
1903.....	371,745	888,094			189,573	846,310		
1904.....	275,927	808,022			257,172	1,148,090	20,984	78,936
1905.....	386,366	1,054,712			269,256	1,202,035	44,866	179,464
1906.....	476,364	1,540,976			236,205	1,054,485	69,486	268,042
1907.....	524,110	1,688,070			241,572	1,049,432	76,321	297,595
1908.....	505,929	1,658,151			276,683	1,482,191	75,645	309,019
1909.....	492,992	1,608,092			281,786	1,509,567	87,233	366,734
1910.....	508,058	1,655,775	24,685	148,110	248,394	1,172,675	121,578	486,312

Coke is made in Nova Scotia principally at Sydney and Sydney Mines, but also at Westville, Stellarton, and Londonderry. This Province in 1910 produced about 56 per cent of the total for Canada and the output is used almost entirely in the manufacture of iron. In Ontario coke is made by the Atikokan Iron Company at Port Arthur for use in the Company's blast furnace. By-product ovens are also being erected by the Algoma Steel Co., at Sault Ste. Marie, to supply fuel for the Company's blast furnaces. For both these plants coal is imported from the United States. In Alberta coke ovens are operated at Coleman and Lille near Blairmore, and in British Columbia at Fernie, Michel, Carbonado, and Hosmer in the Crowsnest pass, and at Union bay, Vancouver island. The coke output of these Provinces is used chiefly by the copper and lead smelters; finding a market in the United States as well as in British Columbia.

The total number of ovens in active operation on December 31 was 1,678; while 1,086 were reported idle on the same date and 230 in course of construction. In Nova Scotia the Dominion Iron & Steel Company at Sydney has 500 finished ovens and 120 in course of construction, all of the Otto Hoffman by-product type. The by-products from these ovens include tar and ammonia. The tar is sold to the Dominion Tar and Chemical Company, whose works are contiguous to the coke oven plant, and this product is further treated for the manufacture of refined tar, pitch of various grades, benzole, creosote, carboic acid, etc. The production of tar in 1910 was 3,963,591 gallons and ammonia liquor containing 3,491 tons of sulphate of ammonia. In 1909 the production of tar was 4,016,824 gallons and of sulphate of ammonia 3,351 tons; and in 1908, tar 4,450,166 gallons and sulphate of ammonia 2,984 tons. The Nova Scotia Steel and Coal Company has 30 ovens of the Bauer type and 120 Bernard ovens; the latter are situated

near the blast furnace and the surplus gas is used for the production of steam for the electric power plant. The surplus gas from the Bauer ovens is used in generating steam for general colliery use. The other ovens in this Province number 178 and are all of the beehive type. The Atikokan Iron Co., Ltd., has 100 beehive ovens at Port Arthur, Ontario, and the Algoma Steel Company is erecting 110 Koppers by-product regenerative coke ovens at Sault Ste. Marie. The Company has acquired and is operating coal lands in West Virginia for its supply of coal.

In Alberta the West Canadian Collieries, Ltd., at Lille, has 50 ovens of the Bernard or Belgian type. The ovens of the International Coal and Coke Company at Coleman, 216 in number, are the ordinary beehive as are also the ovens in British Columbia, comprising 1,420 in the Crowsnest district and 150 on Vancouver island.

Statistics of exports and imports of coke, as published by the Customs Department, are shown in Tables 3 and 4 following. The exports are almost altogether from British Columbia, and recently from Alberta, and the imports are from the United States, chiefly for consumption in the iron and steel and smelting industries of Ontario and Quebec.

COKE.—TABLE 3.

## Exports of Coke to the United States, 1897-1910.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1897.....	2,987	6,078	1904.....	102,463	345,031
1898.....	3,774	8,394	1905.....	116,071	509,908
1899.....	5,557	18,726	1906.....	37,003	168,571
1900.....	41,529	131,278	1907.....	70,617	320,357
1901.....	57,505	176,990	1908.....	58,708	248,759
1902.....	62,568	180,920	1909.....	74,067	329,051
1903.....	32,608	135,957	1910.....	57,971	250,715

COKE.—TABLE 4.

## Imports of Oven Coke, 1880-1910.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		\$			\$
1880.....	3,837	19,353	1895.....	43,235	149,434
1881.....	5,492	26,123	1896.....	61,612	203,826
1882.....	8,157	36,670	1897.....	83,330	267,540
1883.....	8,943	38,588	1898.....	135,060	347,040
1884.....	11,207	44,518	1899.....	141,284	362,826
1885.....	11,564	41,391	1900.....	187,878	506,839
1886.....	11,858	39,756	1901.....	308,786	680,138
1887.....	15,110	56,222	1902.....	267,142	842,815
1888.....	25,487	102,334	1903.....	256,723	1,222,756
1889.....	29,557	91,902	1904.....	221,050	765,123
1890.....	36,564	133,344	1905.....	371,593	807,842
1891.....	38,533	177,605	1906.....	480,222	1,311,375
1892.....	43,499	194,429	1907*.....	400,536	1,132,680
1893.....	41,821	156,277	1908.....	619,269	2,166,036
1894.....	42,864	176,996	1909.....	466,292	1,136,624
			1910†.....	702,053	1,695,603

\*For nine months only. †Duty free.

Coke is manufactured from coal mined in five of the coal basins in Canada, viz.: the Sydney field, the Pictou field, both in Nova Scotia; the Frank-Blair-more field in southwestern Alberta; the Crowsnest field in East Kootenay, and the Comox field on Vancouver island, both of the latter in British Columbia.



The following table shows the proportionate yield in coke from the coals in the various fields charged into the ovens. These percentages of coke produced relatively to the coal charged have been compiled from the returns of the last six years:—

Year.	Sydney Field.	Pictou Field.	Frank-Blairmore Field.	Crowsnest Field.	Comox Field, Vancouver Island.
1905.....	62.90	50.22	65.14	64.38	49.61
1906.....	63.65	53.41	66.74	62.29	38.90
1907.....	64.22	54.81	65.36	63.97	49.10
1908.....	66.42	55.81	58.92	65.08	49.73
1909.....	65.24	59.17	66.96	67.67	58.26
1910.....	67.32	60.36	62.72	65.39	60.68
Average*.....	65.08	53.35	64.01	64.79	54.20

\*The average has been computed from the total coal charged during the six years, and the total coke output resulting.

In the Sydney field the ovens used are all by-product ovens, whereas the coal of the Pictou field is made into coke in beehive ovens. We may here mention that a certain amount of Springhill coal, Cumberland field, is mixed with this coal, which it has not been possible to separate to calculate the yield in coke.

In the Blairmore field both Belgian ovens and beehive ovens are used. On Vancouver island the coke is made in beehive ovens.

It may be interesting to point out that in this last field, only the fine screenings are used in the manufacture of coke. This coal is thoroughly washed before being charged into the ovens, and the refuse resulting from this treatment often amounts to 50 per cent. This refuse is rejected, and only the washed coal is charged into the ovens. The yield is computed from the quantity of washed coal.

## FELDSPAR.

The total shipments of feldspar in 1910, were reported as 15,809 tons, valued at \$47,667, of which 90 tons, valued at \$1,800, represented shipments of high grade dental spar from Quebec province, and the greater part of the balance, shipments from the district north of Kingston, Ont.

The shipping firms were:—

The Dominion Mining Syndicate (O'Brien & Fowler), Ottawa, Ont.

The Kingston Feldspar & Mining Co., Kingston, Ont.

The McDonald Feldspar Company, Ltd., Verona, Ont.

Ojaipée Silica Feldspar Co., Ltd., 375 Spadina Ave., Toronto, Ont.

Practically all of the Canadian production is exported, the greater part finding a market with the pottery manufacturers in Trenton, N.J., and East Liverpool, Ohio. The principal buyers of Canadian feldspar in the United States are: The Potters Mining and Milling Company, East Liverpool, Ohio; The Eureka Flint and Spar Company, Trenton, N.J.; The Pennsylvania Feldspar Company, 706 Franklyn Bank Building, Philadelphia, Pa., and the American Feldspar Company, Barnard Sta., N.Y.

The domestic production of feldspar in the United States in 1909, amounted to 76,539 tons, valued at \$401,788, of which 18,413 tons, valued at \$37,646, was crushed pegmatite, used for poultry grit and the manufacture of roofing, leaving about 58,126 tons of pottery grade.

The imports of feldspar into Canada are not separately stated in the customs reports, but considerable quantities of ground feldspar are imported for use in the manufacture of pottery, sanitary ware, enamelled ware, etc. The imports are of ground feldspar which are laid down at points of consumption at from \$10 to \$14 per ton.

Following are some of the principal Canadian consumers:—

The Dominion Sanitary Pottery Company, St. Johns, Que.

The Canadian Trenton Potteries Company, Ltd., St. Johns, Que.

The Canada Pottery Co., Ltd., Iberville, Que.

The Amherst Foundry Co., Ltd., Amherst, N.S.

The Thos. Davidson Manufacturing Company, Ltd., Montreal, Que.

The Standard Ideal Company, Ltd., Port Hope, Ont.

The Kemp Manufacturing Company, Toronto, Ont.

The Standard Sanitary Manufacturing Company, Toronto, Ont.

R. Campbell's Sons, Hamilton, Ont.

The McClary Manufacturing Co., London, Ont.

The annual imports probably reach as much as 2,000 tons, and may amount to much more. No doubt much of this could be shipped from Canadian sources if the material were suitably prepared for the market.

Statistics of the production and exports of feldspar, are shown in the following table:—

### Production and Exports of Feldspar.

Calendar Year.	PRODUCTION.		EXPORTS.	
	Tons.	Value	Tons.	Value.
		\$		\$
1890.....	700	3,500		
1891.....	685	3,425		
1892.....	175	525		
1893.....	575	4,525	50	500
1894.....	Nil.	Nil.	Nil.	Nil.
1895.....		*2,545		2,545
1896.....	972	*2,583	972	2,583
1897.....	1,400	3,290	3,078	5,637
1898.....	2,500	6,250	1,542	4,396
1899.....	3,000	6,000	1,757	5,126
1900.....	318	1,112	379	1,116
1901.....	5,350	10,700	4,367	10,973
1902.....	7,576	15,152	7,374	13,708
1903.....	13,928	18,966	13,760	23,319
1904.....	11,083	22,166	13,960	29,263
1905.....	11,700	23,400	9,161	27,660
1906.....	16,948	40,890	18,183	60,312
1907.....	12,584	29,819	12,068	37,932
1908.....	7,877	21,099	9,524	34,045
1909.....	12,733	40,383	10,834	35,234
1910.....	15,809	47,667	15,601	47,962

\* Exports.

### Uses of Feldspar.

The following notes on the uses of feldspar are taken from an article on the subject by E. S. Bastin, in the 'Mineral Resources of the United States, for 1907.'

"The principal consumers of feldspar are the pottery and enamelled brick and electrical ware manufacturers, its main application being as a constituent part of both body and glaze in true porcelain, white ware, and vitrified sanitary ware, and as a constituent of the slip (underglaze) and glaze in so-called 'porcelain' sanitary wares and enamelled brick. The proportion of feldspar in the body of vitrified wares usually falls between 10 and 35 per cent, though sometimes more. Its melting point being lower than that of the other constituents, it serves as a flux to bind the particles together. In glazes the percentage of feldspar usually lies between 30 and 50. The trade demands that feldspar for pottery purposes be nearly free from iron-bearing minerals (biotite, garnet, hornblende, tourmaline, &c.), and contain little, if any, muscovite. In regard to the percentage of free quartz, the requirements vary with different potters. A few manufacturers of the finer grades of pottery demand less than 5 per cent of free quartz, and may even grind the spar themselves so as to be sure of its quality, preferring to ensure a constant product, even at higher cost, by themselves mixing the requisite quantity of quartz with the

spar. Most potters get satisfactory results with 'Standard' ground spar carrying 15 to 20 per cent of free quartz, and in some cases the percentage runs even higher. In the finely ground mixture as it comes from the mills, it is difficult to separate the quartz from the feldspar by physical methods on account of the extreme fineness of the material. Chemical analysis seems to be the easiest means of determining whether its percentage is high or low.

"Feldspar is also used in emery and carborundum wheel manufacture as a flux to bind the abraiding particles together.

"Small quantities of feldspar are used in the manufacture of opalescent glass. The feldspar used for this purpose is ranked as No. 3 by the miners; it usually contains more free quartz and muscovite than that used for pottery purposes, and in most cases also contains fragments of iron-bearing minerals. Most of the spars known to the writer which are used for opalescent glass are notably richer in soda than in potash. They are usually ground only to a fineness of 50 to 60 mesh.

"Small quantities of carefully selected pure feldspar are used in the manufacture of artificial teeth. Some is used in the manufacture of scouring soaps and window washes, the fact that feldspar is slightly softer than glass rendering these soaps less liable to scratch windows or glassware than are the soaps in which quartz is the abrasive substance. One firm in New York State crushes pegmatite for poultry grit and for a covering for concrete and tarred surfaces, to give the appearance of granite."

### Feldspar Deposits.

The following notes have been compiled from reports of the Geological Survey of Canada, the Ontario Bureau of Mines, and the Mines Branch of the Department of Colonization Mines and Fisheries, Quebec.

#### Ontario.

##### FRONTENAC COUNTY.

##### *Richardson Mine, Bedford Tp., Con. III., Lot. I.*

The Richardson Mine is operated by the Kingston Feldspar Mining and Development Co. of Kingston, and is the largest developed feldspar quarry in Canada. The property was first opened up in December, 1900, since which time to the close of 1910, about 100,000 tons of feldspar have been shipped, in addition to a considerable tonnage of quartz. The property is situated four miles east of Bedford Station on the Kingston and Pembroke railway between Desert and Thirteen island lakes. The mine has been a steady producer since its opening, and the high grade of the product shipped has maintained for it a firm footing in the United States market. The following analyses of this feldspar were published in 1901. No. 1 having been made at Kingston, and No. 2 by Dr. Heinrich Ries of Cornell University.



	No. 1.	No. 2.
	p. c.	p. c.
Silica.....	66·23	65·40
Alumina.....	18·77	18·80
Ferric Oxide.....	Trace.	Trace.
Potash.....	12·09	13·90
Soda.....	3 11	1·95
Lime.....	0·31	Nil.
Magnesia.....	Nil.	Nil.
Loss on Ignition.....	Nil.	0·60
	100·51	100·65

The property was originally opened up by two pits on two deposits separated by a band of quartz. Since 1907, the quartz has been shipped to Welland, Ont., for use in the manufacture of ferro-silicon. The extension of the two original openings and the removal of the quartz will combine the workings into one large open pit, and make accessible a large tonnage of feldspar according to the report of the mine inspector in 1909.

{ *Harris or Jenkins Mine: Bedford Tp., Con. III., Lot 3.*

The property containing about 200 acres situated four miles by road east of Bedford Station on the Kingston & Pembroke railway, was opened in 1902, and is owned by Mr. Charles Jenkins of Petrolea. The mine workings are on the top of a high hill at the northeast end of Thirteen island lake. Many operations were carried on for about three years, about 2,500 tons of feldspar in all being shipped. The mine was closed down in the fall of 1905, and has not since been re-opened.

*Border, Freeman and Walker Mines, Portland and Loughboro Tps.*

The Pennsylvania Feldspar Co. of Toughkenamon, Pa., operated during 1902 and 1903 several properties in Portland and Loughboro townships, including the Border Mine, Portland Tp., Con. XII., west half lot 5, consisting of 60 acres, about two miles west of Verona. The mining work was confined to one small pit forty by thirty feet; Freeman mine, Portland Tp., Con. XII., lot 1, and Loughboro Tp., Con. XII., lot 1, on Fourteen island lake, about five miles east of Verona and the Walker mine, Portland Tp., Con. X., lot 2, five miles east of Verona, all small quarries.

The Verona Mining Company succeeded the Pennsylvania Feldspar Co., and re-opened the old Border mine and also the Verona mine in Portland Tp., Con. XI., lot 16. Mining was carried on during 1906 and 1907, and the properties have since been idle. The total shipment from the properties was about 6,300 tons.



*McDonald Mine, Portland Tp., Con. X., Lots 4 and 5.*

The McDonald Feldspar Co., Ltd., R. R. Gamey, president, was incorporated in May, 1909, and has been operating a feldspar property near Verona during the past two years. Both feldspar and quartz have been shipped.

**Parry Sound District.**

*Ojaipee Mine, Conger Tp., Con. IX., Lot 4.*

This property was opened up during 1910 by the Ojaipee Silica Feldspar Company, Ltd., of Toronto, and trial shipments of both feldspar and quartz were made.

Other occurrences in the province of Ontario have been noted, as follows:—

Frontenac County.—Miller Tp., con. V., lot 11; Bedford Tp., con. IV., lot 5; Kingston Tp., near Kingston Mills and Oso Tp., con. V., lot 10.

Hastings County.—A few shipments have been made from Birds Creek in Hastings to English potteries. There are several large bodies of almost pure orthoclase feldspar in this county which are probably of commercial value as fluxes in the manufacture of pottery ware of various grades. (Ontario Bureau of Mines Report 1898.)

Lanark County.—Burgess Tp.

Carleton County.—March Tp., con. III., lot 6; Huntley Tp., near Carp.

Parry Sound District.—Feldspar claims have been recorded in the townships of McDougall, Conger and Proudfoot.

Rainy River District.—Feldspar may be found in quantities pure enough for porcelain making, as some of the pegmatites notably near the head of Kashabo Lake become in places almost pure feldspar. (Report by W. McInnes, Geological Survey, Vol. X.)

Timiskaming Lake.—There are many large pegmatite dykes close to the line of the Canadian Pacific railway throughout this district (around Lake Timiskaming), which might be examined with a view to obtaining supplies of feldspar. Some of these near Nosbonsing station seemed to furnish abundant and very suitable material. (Report by Dr. Barlow, Geological Survey, Vol. X.)

A concise and interesting article on feldspar mining in Frontenac county, Ontario, was published in the Engineering and Mining Journal, April 11, 1909, page 759, from which the following extracts have been taken:—

"Feldspar deposits in this region are all mined by open cut; the soil is at most not more than three or four feet deep. This is stripped off, the capping removed, and the spar mined by stopes—usually 10 or 12 feet to a stope. At the Freeman and Border mines, the ore is hoisted in wooden buckets and dumped on a pile, later to be hauled by teams to the railroad. At the Richardson mine . . . the ore is hoisted by means of a cable to the top of the hill where the buckets are loaded directly upon special mine cars operating on

a self-acting incline by means of which they reach barges and are towed across the lakes to the railroad. . . . ."

"Drilling is done almost entirely by steam. As yet no drifting has been done. . . . ."

"Where it pays, the impure material is cobbled, but on account of the low price of the product and the relative high cost of mining and transportation, spar which needs constant cobbing cannot be mined at a profit. . . . ."

"The serious difficulty in mining feldspar in this section is transportation. . . . . It may be readily seen how largely the cost of transportation enters into the total cost of production where this item alone ranges from 45 cents to 80 cents per ton, depending on the distance. . . . ."

"In this section the cost of mining runs from \$1.10 per ton loaded on cars at the most favorably situated mines to as high as \$2.75 a ton at smaller mines less favourably situated. It is obvious that one problem needing serious attention is that of transportation to railway points, and where the deposit is of sufficient importance to warrant it, this is being more thoroughly looked after.

"Practically all the feldspar from this region is used in the pottery industry, hence the desirability of keeping out iron compounds, as these produce yellow or brown spots on the finished ware."

### Quebec.

Feldspar is of wide occurrence in the province of Quebec, particularly in the district north of the Ottawa river in the counties of Pontiac, Ottawa and Argenteuil. According to Dr. Ells: "Some of the pegmatite dykes are largely made up of feldspar either white or red in colour, and in some of these the mineral is sufficiently pure to be economically available for the manufacture of certain kinds of porcelain or pottery. There are large masses of this rock throughout the area occupied by the crystalline rocks, but much of it is too remote from convenient shipment to be economically valuable. The pegmatite dykes are numerous in the areas of crystalline limestone though they cut the gneiss formation also." Shipments have been made from the Villeneuve mine near the High Falls on the Lièvre river, and also from several locations in Tempelton and Hull townships.

On the north shore of the St. Lawrence, a large deposit of feldspar is reported at the Bay of Quetachoo Manicouagan, while in Saguenay county, Bergeronnes township, some feldspar was mined from a property known as the McGie mine.

#### *Villeneuve Mine, Ottawa County, Villeneuve Tp., Range 1, Lots 30 and 31.*

According to Dr. Ells, the deposit of feldspar in the Villeneuve mine occurs in a vein of considerable size which has been traced for several hundred yards. The property was opened and operated as a mica mine, and in his report on mica Mr. F. Cirkel refers to it as follows: "The first work on this

property was done in the summer of 1884, by Mr. W. A. Allan, of Ottawa, who afterwards sold the mine to the Canadian Mica and Mining Co., Ltd. This company worked steadily from 1884 to 1888, and has produced about 35,000 pounds of cut marketable sheets of excellent quality. The mine, which was well equipped with modern machinery and employed a staff of about twenty-five men, passed, in 1888, into the hands of Mr. S. P. Franchot, who worked the mine intermittently from 1890 to 1898. The principal work done on the property consists of a drift started at the foot of a hill along the strike of the vein and near the contact with the gneiss. This drift has a length of seventy feet, a width of from fifteen to twenty feet, and is ten feet high. At this drift a shaft has been sunk sixty feet following two small fissures or cavities lined with large mica crystals of fine quality."

This mine has come into prominence on account of the minerals containing rare earths which are found throughout the pegmatite dykes. They include uranite, monazite, cerite, cleveite and pitchblende, etc.

The feldspar, on account of its purity, has been recognized both in England and the United States, as remarkably fit for the manufacture of fine chinaware. In 1889, about 400 tons were shipped to England and the United States.

The following analysis of the feldspar has been made by the United States Geological Survey:—

Silica.. . . .	63.96 per cent.
Alumina.. . . .	19.16 "
Potash.. . . .	16.88 "
Iron.. . . .	Trace.

Recently the property has been acquired by Messrs. O'Brien and Fowler, of Ottawa, and intermittently operated under the direction of Mr. Bush Winning. During 1909 and 1910, about 187 tons of high grade dental spar have been shipped.

*Mines in Templeton and Hull Townships.*—Shipments of feldspar have been made from several properties in Templeton township. A deposit on range II., lot 14, was opened in 1896, and this together with a deposit on lot 26, concession VIII., supplied the greater part of from 7,000 to 8,000 tons of feldspar that was shipped from this district from 1896 to 1901. Development work was done also on deposits situated on lot 25, range V.; lot 26, range VII., of Templeton, and lots 5, 7 and 9, range X.; lot 14, range VII., and on lots 6, 7 and 9, range XII., of Hull.

*Buckingham Township.*—Feldspar has been worked on lots 12 and 14, range XII., and on lot 20, range 5, about 250 tons having been shipped in 1905.

*Calumet Island.*—The occurrence of feldspar is reported on range XI., lot 1; range XII., lot 1, and range IV., lots 7 and 8.



## GRAPHITE.<sup>1</sup>

The total shipments of graphite in 1910 were returned as 1,392 tons, valued at \$74,087, comprising 245 tons of crude graphite, valued at \$2,450, and 1,147 tons of refined graphite, valued at \$71,637, an average of \$62.46 per ton, or 3-12 cents per pound for the refined.

In 1909, the shipments were 864 tons of refined product, valued at \$47,800, an average of \$55.32 per ton. The 1908 shipments totalled 251½ tons, valued at \$5,565, comprising 250 tons of crude, valued at \$5,400, and 1½ tons of refined graphite, valued at \$165; while the 1907 shipments included 459 tons of crude mineral, valued at \$11,000, and 120 tons of refined product, valued at \$5,000.

Statistics of annual production since 1886, are shown in Table 1.

GRAPHITE.—TABLE 1.

### Annual Production.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	500	4,000	1899.....	1,130	24,179
1887.....	300	2,400	1900.....	1,922	31,040
1888.....	150	1,200	1901.....	2,210	38,780
1889.....	242	3,160	1902.....	1,095	28,300
1890.....	175	5,200	1903.....	728	23,745
1891.....	260	1,560	1904.....	452	11,760
1892.....	167	3,763	1905.....	541	16,735
1893.....	Nil.	Nil.	1906.....	387	18,300
1894*.....	3	223	1907.....	579	16,000
1895.....	220	6,150	1908.....	251½	5,565
1896.....	139	9,455	1909.....	864	47,800
1897.....	436	16,240	1910.....	1,392	74,087
1898.....		13,698			

\* Exports.

(1) A special bulletin on graphite has been published by the Mines Branch, entitled "Graphite, its Properties, Occurrences, Refining and Uses," by Fritz Cirkel, Mines Branch, Department of Mines, 1907.

The graphite shipments in 1910, comprised 155 tons, valued at \$16,000 from the mills in the Buckingham district, Quebec, and 1,237 tons of crude and refined graphite, valued at \$58,087, from mines and mills in Ontario.

The 1909 production represented 134 tons, valued at \$10,176 from the Quebec mills, and 730 tons, valued at \$37,624, from the Ontario mills.

Considerable activity has been evidenced during the year in the development of properties and the building of mills.

The exports of graphite, according to customs returns, are shown in Table 2. These are classified as crude ore and concentrates and manufactures. The ore and concentrates exported in 1910 are given as 788 tons, valued at \$53,008,

and manufactures of graphite to the value of \$66,658, or a total valuation of \$119,666. Of the ore and concentrates exported, 223 tons, valued at \$16,453, were reported as shipped to Great Britain; 557 tons, valued at \$35,555, to the United States; and 9 tons, valued at \$1,000, to other countries.

The manufactures of plumbago exported, included \$3,051 to Great Britain, \$63,466 to the United States, and \$141 to other countries.

GRAPHITE.—TABLE 2.

## Exports of Graphite.

Year.	CRUDE.		MANU-FACTURES.	Total Value.
	Tons.	Value.	Value.	
		\$	\$	\$
1886				3,586
1887				3,017
1888				1,080
1889				538
1890				1,529
1891				72
1892				3,952
1893	1	38	10	48
1894	3	223		223
1895	544	4,803	30	4,833
1896	136	9,126	354	9,480
1897	205	2,988	1,337	4,325
1898	591	11,527	1,571	13,098
1899	1,237	19,326	3,164	22,490
1900	1,550	40,132	6,065	46,197
1901	1,194	30,535	4,567	35,102
1902	886	23,097	1,742	24,839
1903	412	26,230	17,412	43,642
1904	177	9,609	6,958	16,567
1905	254	7,596	518	8,114
1906	106	2,468	5,274	7,742
1907	121	3,036	2,847	5,883
1908	385	10,158	876	11,034
1909	1,004	52,438	864	53,302
1910	788	53,008	66,658	119,666

Statistics of imports of graphite into Canada, given in Table 3, show an importation principally of manufactured graphite products, to a value of \$99,997 during the fiscal year 1910, and a valuation of \$76,548 during the previous fiscal year.

The imports of graphite during the calendar year, 1910, were valued at \$112,853, and comprised plumbago, not ground, \$4,867; black lead, \$10,048; plumbago, ground, and manufactures, \$45,042, and crucibles, clay or plumbago, \$52,896.

The imports during the calendar year, 1909, were valued at \$94,392, and included, plumbago, not ground, \$5,075; black lead, \$11,638; plumbago, ground, and manufactures, \$37,538; and crucibles, clay or plumbago, \$40,141.



## GRAPHITE.—TABLE 3.

## Imports of Raw and Manufactured Graphite.

Fiscal Year.	Plumbago not ground.	Black Lead.	Ground and Manufactures.	Crucibles, Clay or Plumbago.	Total.
	\$	\$	\$	\$	\$
1880.....	1,677	18,055	2,738	.....	22,470
1881.....	2,479	26,544	1,202	.....	30,225
1882.....	1,028	25,132	2,181	.....	28,341
1883.....	3,147	21,151	2,141	.....	26,439
1884.....	2,891	24,002	2,152	.....	29,045
1885.....	3,729	24,487	2,805	.....	31,021
1886.....	5,522	23,211	1,408	.....	30,141
1887.....	4,020	25,766	2,830	.....	32,616
1888.....	3,802	7,824	22,604	.....	34,230
1889.....	3,546	11,852	21,789	.....	37,187
1890.....	3,441	10,276	26,605	.....	40,322
1891.....	7,217	8,292	26,201	.....	41,710
1892.....	2,988	13,560	23,085	.....	39,633
1893.....	3,293	16,595	23,051	.....	42,939
1894.....	2,177	17,614	15,196	1,490	36,477
1895.....	2,586	13,922	16,361	5,627	38,496
1896.....	2,865	18,434	12,090	7,407	40,796
1897.....	1,406	17,863	14,768	5,906	39,943
1898.....	1,862	19,638	20,120	12,533	54,153
1899.....	4,979	21,334	22,140	14,350	62,803
1900.....	4,437	22,078	17,869	20,571	64,955
1901.....	2,357	25,646	11,016	38,874	77,893
1902.....	3,649	20,467	15,021	28,635	67,772
1903.....	2,870	22,559	12,493	34,624	72,546
1904.....	1,802	26,053	12,737	28,773	69,365
1905.....	2,499	30,743	13,192	31,353	77,787
1906.....	2,791	33,907	19,058	32,950	88,706
1907 (9 mos.).....	3,176	16,646	13,740	27,271	60,833
1908.....	3,030	9,042	31,428	40,092	83,592
1909.....	1,408	11,009	26,918	37,213	76,548
1910.....	5,223	11,930	39,815	43,029	99,997

The market for graphite in Great Britain is to some extent indicated by the imports into that country which are shown as follows:—

Imports of Plumbago into Great Britain,<sup>1</sup> 1909.

Country Whence Consigned.	Tons (short.)	Value.	Value per Ton.
		\$	\$
Germany.....	2,172	91,094	42
France.....	321	20,659	64
Italy.....	1,217	26,173	21½
Austria-Hungary.....	413	18,279	44
Japan.....	4,052	106,147	26
United States.....	326	32,042	98
Other foreign countries.....	704	29,862	42
British India.....	2,044	141,815	69
Ceylon and dependencies.....	7,237	690,434	95
Australia.....	71	16,790	236
Canada.....	71	7,957	112
Other British possessions.....	14	949	68
Total.....	18,642	1,182,201	63

<sup>1</sup> British Trade Report, 1909.

Prices of refined graphite in London, as quoted in the "Mining Journal" of December, 1910, were as follows:—

PURIFIED MILLED AND GROUND.

Ceylon,	97 to 99 per cent	£59 to £63 per ton c. i. f. London.
"	90 to 91 "	40 to 42 " "
"	80 to 81 "	30 to 32 " "
"	70 to 71 "	27 to 28 " "
American, large flake,		45 to 49 " "
" small "		35 to 45 " "

Following is a list of the principal firms operating graphite mines:—

Operator.	Location of Mine.	Address.
Buckingham Graphite Co., Ltd.	Buckingham Tp., Que.....	Buckingham, Que.
The Bell Graphite Co., Ltd.....	" " " " " "	Box 185.
Graphite Limited.....	Amherst Tp., Que.....	Montreal, Que., Board of Trade Bldg.
The Canadian Graphite Co., Ltd.	Wentworth Tp., Que.....	Montreal, Que., 107 Coristine Bldg.
Peerless Graphite Co.....	Buckingham, Que.....	Rochester, N. Y., 205 Main West.
Globe Refining Co.....	N. Burgess Tp., Ont.....	Ottawa, Ont., 175 Cooper St.
Black Diamond Graphite Co., Ltd.....	Brougham Tp., Ont.....	Calabogie, Ont.
The Black Prince Graphite Mining Co.....	Renfrew Co., Ont.....	Ottawa, 'Citizen' Bldg.

ARTIFICIAL GRAPHITE.

The manufacture of artificial graphite in electric furnaces has been carried on for some years at Niagara Falls, New York, by the International Atcheson Graphite Company. A plant has also been established on the Canadian side of the river, and the production of artificial graphite, during 1910, is reported as 2,442,166 pounds, as compared with a production of 513,436 pounds during 1909; 428,540 pounds during 1908; 407,779 pounds during 1907, and 445,047 pounds during 1906.

## GYPSUM.

The provinces of Nova Scotia and New Brunswick have for many years been the principal centres of the gypsum industry in Canada, while at the same time there has been a small annual production in Ontario. During the past ten years the gypsum deposits north of Lake St. Martin, Manitoba, have been operated with a growing annual production. Recently special interest has been shown in the development of several gypsum deposits in British Columbia, although as yet, there has been no actual commercial production west of Manitoba.

A bulletin<sup>1</sup> on the maritime gypsum deposits has recently been published by the Mines Branch, while the Ontario and western deposits are at present under investigation with a view to the publication of a special report on these occurrences.

The total shipments of gypsum products in 1910, including crude, ground, and calcined gypsum, were 525,246 tons, valued at \$934,446, as compared with 473,129 tons, valued at \$809,632 in 1909, an increase of 11 per cent in quantity, and 15 per cent in total value.

The total quantity of crude gypsum mined in 1910, was 548,019 tons, as compared with 493,086 tons in 1909. The quantity calcined in 1910, was reported 69,889 tons, as compared with 63,670 tons in 1909. The total shipments in 1910, included 469,573 tons of crude gypsum, valued at \$508,686, or an average value of \$1.08 per ton; 6,121 tons of ground gypsum, valued at \$17,390, or an average of \$2.84; and 49,552 tons of calcined gypsum, valued at \$408,370, or an average value of \$8.24.

The total quantity of gypsum mined and the total quantity calcined during the past six years are shown hereunder.

Year.	Total Gypsum mined.	Gypsum calcined.
	Tons.	Tons.
1905.....	443,569	26,855
1906.....	492,759	28,831
1907.....	489,962	34,752
1908.....	375,444	48,727
1909.....	493,086	63,670
1910.....	548,019	69,889

A very large part of the gypsum mined is shipped in lump form as quarried to calcining mills in the United States. From 8,000 to 10,000 tons are ground for use as land plaster, &c., while the balance, about 12 per cent, is calcined in Canada for the manufacture of plaster of Paris, wall plaster, and

<sup>1</sup> Gypsum deposits of the Maritime Provinces of Canada, including the Magdalen Islands, by W. F. Jennison, M. E., 1911, Mines Branch, Dept. of Mines, Ottawa.

other products. Crude gypsum is also used in the manufacture of Portland cement.

The United States tariff on gypsum was reduced in August, 1909, that on crude gypsum from 50 cents a ton to 30 cents a ton, and on ground or calcined gypsum from \$2.25 per ton to \$1.75 per ton.

The present United States tariff on gypsum and gypsum products is defined in the following clause:—

“Plaster rock or gypsum, crude, thirty cents per ton; if ground or calcined, one dollar and seventy-five cents per ton; pearl hardening for paper makers’ use, twenty per centum ad valorem; Keen’s cement or other cement of which gypsum is the component material of chief value; if valued at ten dollars per ton or less, three dollars and fifty cents per ton; if valued above ten dollars and not above fifteen dollars per ton, five dollars per ton; if valued above fifteen dollars and not above thirty dollars per ton, ten dollars per ton; if valued above thirty dollars per ton, fourteen dollars per ton.”

During the first calendar year’s operations under this reduced tariff, there was an increase of about 17 per cent in the shipments from Nova Scotia, but a decrease of about 16 per cent in the New Brunswick shipments, while during the same time the imports of plaster of Paris and ground gypsum into Canada were more than doubled.

Detailed statistics of the production and sales during the past five years of crude, crude ground, and calcined gypsum, are shown in Table 1; while the total annual sales of gypsum products since 1886, are shown in Table 2, and the sales by provinces in Table 3.

GYPSUM.—TABLE 1.

Sales and Shipments of Crude, Ground, and Calcined Gypsum, 1905-1910.

	CRUDE (LUMP).			CRUDE GROUND.		
	Tons.	Value.	Per ton.	Tons.	Value.	Average per ton.
		\$	\$ cts.		\$	\$ cts.
1905.....	412,155	409,146	0 99	3,255	8,779	2 70
1906.....	442,132	473,960	1 07	3,195	9,823	3 07
1907.....	454,668	473,831	1 04	6,732	16,268	2 42
1908.....	298,188	307,532	1 03	9,504	25,468	2 68
1909.....	423,474	457,038	1 08	8,814	26,159	2 97
1910.....	469,573	508,686	1 08	6,121	17,390	2 84

	CALCINED.			TOTAL SALES.		
	Tons.	Value.	Per ton.	Tons.	Value.	Average per ton.
		\$	\$ cts.		\$	\$ cts.
1905.....	26,748	168,243	6 29	442,158	586,168	1 32
1906.....	23,695	159,511	6 73	469,022	643,294	1 37
1907.....	24,521	156,815	6 40	485,921	646,914	1 33
1908.....	33,272	242,701	7 29	340,964	575,701	1 69
1909.....	40,841	326,435	7 99	473,129	809,632	1 71
1910.....	49,552	408,370	8 24	525,246	934,446	1 78

GYPSUM.—TABLE 2.

## Annual Production of Gypsum Products.

Calendar Year.	Tons.	Value.	Average per ton.	Calendar Year.	Tons	Value.	Average per ton.
		\$	\$ cts.			\$	\$ cts.
1886.....	162,000	178,742	1 10	1898.....	219,256	232,515	1 06
1887.....	154,008	157,277	1 02	1899.....	244,566	257,329	1 05
1888.....	175,887	179,393	1 01	1900.....	252,101	259,009	1 02
1889.....	213,273	205,108	0 96	1901.....	293,799	340,148	1 16
1890.....	226,509	194,033	0 86	1902.....	333,599	379,479	1 14
1891.....	203,605	206,251	1 01	1903.....	314,489	388,459	1 24
1892.....	241,048	241,127	1 00	1904.....	345,961	373,474	1 08
1893.....	192,568	196,150	1 02	1905.....	442,158	586,168	1 32
1894.....	223,631	202,031	0 90	1906.....	469,022	643,294	1 37
1895.....	226,178	202,608	0 89	1907.....	485,921	646,914	1 33
1896.....	207,032	178,061	0 86	1908.....	340,964	575,701	1 69
1897.....	239,691	244,531	1 02	1909.....	473,129	809,632	1 71
				1910.....	525,246	934,446	1 78



## GYPSUM.—TABLE 3.

## Annual Production by Provinces.

Calendar Year.	NOVA SCOTIA.		NEW BRUNSWICK.		ONTARIO.		MANITOBA.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$		\$
1887.....	116,346	116,346	29,102	29,216	8,560	11,715		
1888.....	124,818	120,429	44,369	48,764	6,700	10,200		
1889.....	165,025	142,850	40,866	49,130	7,382	13,128		
1890.....	181,285	154,972	39,024	30,986	6,200	8,075		
1891.....	161,934	153,955	36,011	33,996	5,660	18,300		
1892.....	197,019	170,021	39,709	65,707	4,320	5,399		
1893.....	152,754	144,111	36,916	41,846	2,898	10,193		
1894.....	168,300	147,644	52,962	48,200	2,369	6,187		
1895.....	156,809	133,929	66,949	63,839	2,420	4,840		
1896.....	136,590	111,251	67,137	59,024	3,305	7,786		
1897.....	155,572	121,754	82,658	118,116	1,461	4,661		
1898.....	132,046	106,610	86,083	121,704	1,087	4,201		
1899.....	126,754	102,055	116,792	151,296	1,020	3,978		
1900.....	138,712	108,828	112,294	145,850	1,095	4,331		
1901.....	170,100	136,947	121,595	189,709	1,504	5,692	600	7,800
1902.....	206,087	181,425	124,041	170,153	1,917	7,699	1,554	20,202
1903.....	189,427	173,881	119,182	172,080	2,720	21,988	3,160	20,510
1904.....	218,580	153,600	190,991	187,524	2,390	18,350	4,000	14,000
1905.....	272,252	298,248	163,553	232,586	1,853	23,834	4,500	31,500
1906.....	333,312	345,414	131,246	250,960	2,965	24,420	3,200	22,500
1907.....	357,411	380,859	118,106	213,638	10,404	52,417		
1908.....	234,455	230,433	81,620	191,312	10,389	42,456	14,500	111,500
1909.....	345,682	364,379	98,716	226,975	11,731	48,278	17,000	170,000
1910.....	400,455	458,638	90,236	213,579	15,055	67,229	19,500	195,000

Statistics of exports and imports of gypsum, as compiled from the Reports of Trade and Navigation, are shown in Tables 4, 5 and 6. The annual exports of crude gypsum, which are almost altogether from the maritime provinces, are shown in Table 4.

There is a small export of ground gypsum, the annual value of which is shown in Table 5. The imports of gypsum shown in Table 6 have, until the past three or four years, been comparatively small; however, during these years there has been a considerable increase in the imports of crude gypsum and of plaster of Paris. The statistics given in Table 6, cover the fiscal year. The imports during the calendar year, 1910, include crude gypsum 12,271 tons, valued at \$21,073 or \$1.72 per ton; ground gypsum, 6,690 tons, valued at \$13,242, or \$1.98 per ton; and plaster of Paris, 19,045 tons, valued \$135,483, or \$7.11 per ton, or a total tonnage of 38,006, and a total value of \$169,798.

The imports of plaster of Paris previous to 1905, were comparatively small, ranging from only 150 tons to 720 tons annually. During the past five years, however, these imports have risen rapidly to over 20,000 tons per annum.

GYPSUM.—TABLE 4.  
Exports of Crude Gypsum.

Calendar Year.	NOVA SCOTIA.		NEW BRUNSWICK.		ONTARIO.		TOTAL.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$		\$
1874.....	67,830	68,164					67,830	68,164
1875.....	86,065	86,193	5,420	5,420			91,485	91,613
1876.....	87,720	87,590	4,925	6,616	120	180	92,765	94,386
1877.....	106,950	93,867	5,030	5,030			111,980	98,897
1878.....	88,631	76,695	16,335	16,435	489	675	105,455	93,805
1879.....	95,623	71,353	8,791	8,791	579	720	104,993	80,864
1880.....	125,685	111,833	10,375	10,987	875	1,240	136,935	124,060
1881.....	110,303	100,284	10,310	15,025	657	1,040	121,270	116,349
1882.....	133,426	121,070	15,597	24,581	1,249	1,946	150,272	147,597
1883.....	145,448	132,834	20,242	35,557	462	837	166,152	169,228
1884.....	107,653	100,446	21,800	32,751	688	1,254	130,141	134,451
1885.....	81,887	77,898	15,140	27,730	525	787	97,552	106,415
1886.....	118,985	114,116	23,498	40,559	350	538	142,833	155,213
1887.....	112,557	106,910	19,942	39,295	225	337	132,724	146,542
1888.....	124,818	120,429	20	50	670	910	125,508	121,389
1889.....	146,204	142,850	31,495	50,862	483	692	178,182	194,404
1890.....	145,452	139,707	30,034	52,291	205	256	175,691	192,254
1891.....	143,770	140,438	27,536	41,350	5	7	171,311	181,795
1892.....	162,372	157,463	27,488	43,623			189,860	201,086
1893.....	132,131	122,556	30,061	36,706			162,192	159,262
1894.....	119,569	111,586	40,843	46,538			160,412	158,124
1895.....	133,369	125,651	56,117	67,593			189,486	193,244
1896.....	115,331	109,054	64,946	77,535			181,277	186,589
1897.....	122,984	116,665	66,222	80,485			189,206	197,150
1898.....	99,215	93,474	70,399	81,433			169,614	174,907
1899.....	104,795	99,984	96,831	108,094	* $\frac{1}{2}$	12	201,626	208,090
1900.....							188,262	201,912
1901.....							236,247	231,594
1902.....							289,600	295,215
1903.....							287,496	311,580
1904.....							298,211	316,436
1905.....							359,246	388,474
1906.....							404,464	462,814
1907.....							375,026	424,794
1908.....							280,091	324,574
1909.....							315,201	372,286
1910.....							346,081	416,725

\* Exported from British Columbia.

GYPSUM.—TABLE 5.  
Exports of Ground Gypsum.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1890.....	105	1897.....	6,763	1904.....	2,333
1891.....	588	1898.....	6,448	1905.....	2,673
1892.....	20,255	1899.....	8,123	1906.....	2,934
1893.....	22,132	1900.....	19,834	1907.....	557
1894.....	20,054	1901.....	15,337	1908.....	9,765
1895.....	22,233	1902.....	5,101	1909.....	2,787
1896.....	21,267	1903.....	12,457	1910.....	12,306

## GYPSUM.—TABLE 6.

## Imports of Gypsum.

Fiscal Year.	CRUDE GYPSUM.		GROUND GYPSUM.		PLASTER OF PARIS.	
	Tons.	Value.	Lbs.	Value.	Lbs.	Value.
		\$		\$		\$
1880.....	1,854	3,203	1,606,578	5,948	667,676	2,376
1881.....	1,731	3,442	1,544,714	4,676	574,006	2,864
1882.....	2,132	3,761	759,460	2,576	751,147	4,184
1883.....	1,384	3,001	1,017,905	2,579	1,448,650	7,867
1884.....		3,416	687,432	1,936	782,920	5,226
1885.....	1,353	2,354	461,400	1,177	689,521	4,809
1886.....	1,870	2,429	224,119	675	820,273	5,463
1887.....	1,557	2,492	13,266	73	594,146	4,342
1888.....	1,236	2,193	106,068	558	942,338	6,662
1889.....	1,360	2,472	74,390	372	1,173,996	8,513
1890.....	1,050	1,928	434,400	2,136	693,435	6,004
1891.....	376	640	36,500	215	1,035,605	8,412
1892.....	626	1,182	310,250	2,149	1,166,200	5,595
1893.....	496	1,014	140,830	442	552,130	3,143
1894.....		1,660	23,270	198	422,700	2,386
1895.....	603	960	20,700	88	259,200	1,619
1896.....	1,045	848	64,500	198	297,000	2,000
1897.....		772	45,000	123	969,900	4,489
1898.....	1,147	1,742	35,700	293	329,600	2,025
1899.....	325	692	33,900	338	496,300	3,120
1900.....	77	958	6,300	69	849,100	6,492
1901.....	286	1,125	65,400	1,097	502,200	3,978
1902.....	541	1,697	56,700	249	475,300	2,641
1903.....	1,076	2,187	68,700	228	630,800	3,599
1904.....	249	663	106,800	559	625,100	2,885
1905.....	2,344	7,386	2,255,700	2,681	7,924,100	37,643
1906.....	6,332	22,008	1,968,600	1,799	12,866,500	43,742
1907 (9 mos).....	9,189	23,410	609,600	1,619	19,849,400	58,364
1908.....	9,393	36,510	382,500	1,781	15,020,000	51,328
1909.....	10,317	35,268	6,286,200	5,765	17,009,000	64,849
1910.....	3,790	12,137	21,417,000	17,402	42,095,700	123,965

Crude gypsum, duty free. Ground gypsum, duty 15 per cent. Plaster of Paris, duty 12½c. per 100 lbs.

The province of Nova Scotia is the largest producer of gypsum. In both this province and New Brunswick, the deposits are extensive and the facilities for water shipment to United States ports unexcelled. The total quantity of crude gypsum mined in Nova Scotia in 1910, was 438,131 tons as compared with 357,813 tons in 1909; 254,540 tons in 1908, and 351,611 tons in 1907; of the total in 1910, about 88 per cent was mined from quarries in Hants county at Windsor, Walton, Cheverie, Noel, etc., the balance being quarried at St. Ann, Victoria county and Cheticamp, Inverness county. About 89 per cent of the total tonnage quarried was shipped crude chiefly to United States mills. A small tonnage was calcined in local mills for home consumption, the shipments of calcined gypsum being 7,028 tons.

In New Brunswick the principal operating quarries are located at Hillsborough, some production being also made from the Tobique river deposits in Victoria county. The total crude gypsum mined in the province in 1910,

was 97,867 tons, as against 99,539 tons in 1909, and 90,015 tons in 1908. About 71 per cent of the output was shipped crude, either in lump or ground, and the balance calcined, the calcined product finding a market throughout Canada.

In Ontario, 12,021 tons were reported as having been mined during 1910, as compared with 10,734 tons in 1909, and in Manitoba the tonnage mined in 1910, was 25,000, as against 22,000 tons in 1909. The output in both these provinces is practically all calcined.

Following is a list of the principal active operators.

Location of Quarry.	Name of Operator.	Address.
St. Ann, N.S. ....	Victoria Gypsum Mining and Mfg. Co.	Quarry, St. Ann, N.S.
Cheticamp, N.S. ....	Great Northern Mining and Ry. Co., Ltd.	Eastern Harbour, N.S.
Cheverie and Walton, N.S. ....	Albert Parsons. ....	Walton, N.S.
Newport Station, N.S. ....	Windsor Gypsum Co. ....	Windsor, N.S.
Eagle Swamp, N.S. ....	Wentworth Gypsum Co, Ltd. ....	"
Burtons, N.S. ....	Windsor Plaster Co., Ltd. ....	"
Threemile Plains, N.S. ....	Nova Scotia Gypsum Co., Ltd. ....	Threemile Plains, N.S.
Nappan, N.S. ....	Maritime Gypsum Co., Ltd. ....	New York, 381 Fourth Ave.
Noel, N.S. ....	Noel Plaster Co. ....	Noel, N.S.
Avondale, N.S. ....	Newport Plaster Mining and Mfg. Co.	Windsor, N.S.
McKinnon Harbour, N.S. ....	Newark Plaster Co. ....	McKinnon Harbour, N.S.
Hillsborough, N.B. ....	Hillsboro Plaster Co. ....	Windsor, N.S.
Hillsborough, N.B. ....	Albert Manufacturing Co. ....	Hillsborough, N.B.
Tobique River, N.B. ....	John E. Stewart. ....	Andover, N.B.
Caledonia, Ont. ....	Alabastine Co., Paris, Ltd. ....	Paris, Ont.
Gypsumville, Man. ....	Manitoba Gypsum Co., Ltd. ....	Winnipeg, Man.
Oneida, Ont. ....	The Crown Gypsum Co., Ltd. ....	Caledonia, Box 14
.....	Wm. Smith. ....	" Box 83, Ont.

## MANGANESE.

The Department has not received any direct return of manganese products during the past two years, a small export of manganese is, however, reported by the Customs Department of 3 tons, valued at \$434 in 1909, and 4 tons, valued at \$160 in 1910.

The manganese industry was at one time of considerable magnitude in the provinces of Nova Scotia and New Brunswick, particularly during the decade between 1880 and 1890, the annual value of shipments ranging from \$30,000 to nearly \$50,000.

Statistics of annual production are shown in Table 1, and of exports in Table 2. The annual imports of oxide of manganese are shown in Table 3.

MANGANESE.—TABLE 1.

### Annual Production.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
		\$	\$ cts.			\$	\$ cts.
1886.....	1,789	41,499	23 20	1899.....	1,581	20,004	12 65
1887.....	1,245	43,658	35 07	1900.....	30	1,800	60 00
1888.....	1,801	47,944	26 62	1901*.....	440	4,820	10 95
1889.....	1,455	32,737	22 50	1902*.....	172	4,062	23 62
1890.....	1,328	32,550	24 51	1903.....	91	2,775	30 49
1891.....	255	6,694	26 25	1904.....	66	2,740	41 51
1892.....	115	10,250	89 13	1905*.....	22	1,720	78 18
1893.....	213	14,578	68 44	1906*.....	93	925	9 95
1894.....	74	4,180	56 49	1907*.....	1	22	22 00
1895.....	125	8,464	67 71	1908.....	Nil.	.....	.....
1896*.....	123½	3,975	32 19	1909.....	Nil.	.....	.....
1897*.....	15½	1,166	76 46	1910.....	Nil.	.....	.....
1898.....	50	1,600	32 00				

\* Exports.



MANGANESE.—TABLE 2.  
Exports of Manganese Ore.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1873.....	1,031	20,192	1892.....	143	8,205
1874.....	732	16,973	1893.....	133	12,521
1875.....	203	5,514	1894.....	56	3,120
1876.....	412	8,039	1895.....	108 3	6,351
1877.....	891	15,909	1896.....	123 5	3,975
1878.....	626	10,860	1897.....	15 3	1,166
1879.....	1,886	27,436	1898.....	11	325
1880.....	2,179	34,797	1899.....	70	2,410
1881.....	1,704	40,554	1900.....	34	1,720
1882.....	894	25,747	1901.....	440	4,820
1883.....	1,326	25,343	1902.....	172	4,062
1884.....	603	20,089	1903.....	135	1,889
1885.....	1,684	34,649	1904.....	123	2,706
1886.....	(a) 1,818	58,338	1905.....	22	1,720
1887.....	1,415	34,802	1906.....	93	925
1888.....	1,181	21,832	1907.....	1	22
1889.....	1,436	29,350	1908.....		
1890.....	1,906	36,831	1909.....	3	434
1891.....	255	6,694	1910.....	4	160

(a) 250 tons from Cornwallis should more correctly be classed under the heading of mineral pigments.

MANGANESE.—TABLE 3.  
Imports:—Oxide of Manganese.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1884.....	3,989	258	1898.....	130,456	5,047
1885.....	36,778	1,794	1899.....	141,356	5,539
1886.....	44,967	1,753	1900.....	126,725	4,155
1887.....	59,655	2,933	1901.....	272,134	8,176
1888.....	65,014	3,022	1902.....	476,331	5,360
1889.....	52,241	2,182	1903.....	279,611	8,051
1890.....	67,452	3,192	1904.....	275,696	7,051
1891.....	92,087	3,743	1905.....	235,289	6,832
1892.....	76,097	3,530	1906.....	244,620	5,508
1893.....	94,116	3,696	1907 (9 months).....	386,404	11,087
1894.....	101,863	4,522	1908.....	732,242	17,863
1895.....	64,151	2,781	1909.....	382,137	6,561
1896.....	108,590	4,075	1910.....	810,529	13,048
1897.....	70,663	2,741			

## MICA.

The mica industry during 1910, presented no unusual or special developments. The statistical record shows a considerable increase in shipments, much of which appears to have been shipped from stock mined in previous years. A number of operators on the other hand report the mining of considerable quantities of mica with no shipments, the product being held over for future sale, possibly in the hope of obtaining higher prices. As summarized in last year's report, the mining of mica in Canada is still confined to the western part of the province of Quebec and the eastern part of Ontario. In the former province, deposits of mica are being worked in the region to the north of the city of Ottawa, in the townships of Buckingham, Templeton, Hull and Wakefield. In Ontario there are mica mines in the townships of North Burgess and South Sherbrooke, in Lanark county; South Burgess in the county of Leeds; in the townships of Bedford and Loughborough, in Frontenac county. Practically all the mica mined in Canada is of the amber variety, and is used as insulating material in the manufacture of electrical apparatus.

The principal foreign market of Canadian mica is the United States; an appreciable part of the production is consumed in Canada, and a proportion, which is increasing steadily, finds its way to Great Britain and other European markets, where it comes into competition with mica from India and other countries.

As has been remarked in previous reports, the annual statistics of production of mica which have been published in the past, have been somewhat unsatisfactory, for numerous reasons. The value of the mica varies greatly according to the preparation which it has undergone, of which there are several stages not well defined between the rough cobbed condition at the mine, and the prepared and selected mica as it leaves the trimming factory, and the returns received are not always specific as to which value is adopted. There are, moreover, a great number of small operators, who work deposits intermittently according to the conditions of the mica market, and it is very difficult to obtain complete returns from these.

According to returns received from the operators, shipments of mica during the past two years were as follows:—

## Mica, Rough and Thumb-trimmed, Reported as Shipped during 1909 and 1910.

Province.	1909			1910		
	Tons.	Value.	Value per Ton.	Tons.	Value.	Value per Ton.
		\$	\$ cts.		\$	\$ cts.
Quebec.....	128	93,298	728 89	316	87,295	276 25
Ontario.....	241	54,484	226 07	442	103,090	233 24
Total.....	369	147,782	400 49	758	190,385	251,17

## Mica Reported as Shipped during 1907 and 1908.

Province.	1907			1908		
	Tons.	Value.	Value per Ton.	Tons.	Value.	Value per Ton.
		\$	\$ cts.		\$	\$ cts.
Quebec.....	318	224,197	705 02	148	82,613	558 20
Ontario.....	456	88,402	193 86	288	57,258	198 81
Total.....	774	312,599	403 86	436	139,871	320 80

Table 1 following shows the statistics of mica production since 1886.

MICA.—TABLE 1.

## Annual Production.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1886.....	29,008	1894.....	45,581	1902.....	135,904
1887.....	29,816	1895.....	65,000	1903.....	177,857
1888.....	30,207	1896.....	60,000	1904.....	160,777
1889.....	28,718	1897.....	76,000	1905.....	178,235
1890.....	68,074	1898.....	118,375	1906.....	303,913
1891.....	71,510	1899.....	163,000	1907.....	312,599
1892.....	104,745	1900.....	166,000	1908.....	129,871
1893.....	75,719	1901.....	160,000	1909.....	147,782
				1910.....	190,385

Table 2, following, gives the exports of mica from Canada since 1887, as compiled from the reports of the Customs Department.

MICA.—TABLE 2.

## Exports.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Tons.	Value.
	\$		\$			\$
1887.....	3,480	1894.....	38,971	1902.....		391,812
1888.....	23,563	1895.....	48,525	1903.....		196,020
1889.....	30,597	1896.....	47,756	1904.....		198,482
1890.....	22,468	1897.....	69,101	1905.....		179,049
1891.....	37,590	1898.....	110,507	1906.....	912	581,919
1892.....	86,562	1899.....	158,002	1907.....	558	422,172
1893.....	70,081	1900.....	146,750	1908.....	290	198,839
		1901.....	152,553	1909.....	359	256,834
				1910.....	469	330,903

The destination of exports during the calendar years 1908, 1909 and 1910, was as follows:—

	1908		1909		1910	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
To Great Britain.....	155	81,050	31	24,316	87	37,787
To United States.....	132	115,005	325	229,689	378	291,533
To other countries. ....	3	2,784	3	2,829	4	1,583
Total . . . . .	290	198,839	359	256,834	469	330,903

For the purpose of illustrating the relative importance of the imports of Canadian mica into the United States, as compared with those from other countries, which also supply part of the mica consumed in that country, the following table is given, while the market available in Great Britain is indicated by the statistics given in Table 4.

MICA.—TABLE 3.

Imports of Mica into the United States.<sup>1</sup>

Year ending June 30.	IMPORTS FROM CANADA.		TOTAL IMPORTS FROM ALL COUNTRIES.	
	Tons.	Value.	Tons.	Value.
		\$		\$
1895.....	273	39,637	410	127,515
1896.....	310	57,908	632	214,997
1897.....	208	54,630	441	187,845
1898.....	233	53,854	313	94,294
1899.....	512	131,310	808	259,228
1900.....	549	136,981	1,019	314,882
1901.....	484	161,741	1,011	369,644
1902.....	427	184,287	903	384,818
1903.....	417	196,470	973	414,953
1904.....	287	137,191	693	306,937
1905.....	253	121,560	594	296,362
1906.....	539	328,991	1,206	731,484
1907.....	767	596,321	1,724	1,295,606
1908.....	172	140,166	655	567,550
1909.....	167	132,941	403	313,525
1910.....				

<sup>1</sup> The Foreign Commerce and Navigation of the United States.

MICA.—TABLE 4.

## Imports of Mica into Great Britain.

	1908		1909		1910	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
		\$		\$		\$
Germany.....	73,136	14,581	75,264	13,349	131,152	22,333
German East Africa.....	17,920	2,287	68,320	15,009	10,864	1,859
United States.....	299,264	27,613	142,352	9,441	216,832	18,255
Brazil.....	23,296	3,728	4,032	793	224	212
Other foreign countries..	56,112	11,476	22,848	4,804	112,560	20,727
British India.....	2,737,952	416,343	2,604,224	480,700	2,513,056	453,685
Canada.....	244,944	74,465	67,424	30,791	152,992	49,566
Other British possessions	24,416	3,777	2,352	886	10,976	2,910
Total.....	3,477,040	554,270	2,986,816	555,773	3,148,656	569,449



Following is a list of the principal firms engaged in mica mining:—

Operator.	Location of Mine.	Address.
Ontario :—		
Dominion Improvement and Development Co.....	Lanark Co . . . . . } Burgess Tp . . . . . }	Perth, Box 26.
R. McConnell . . . . .	" " . . . . .	Ottawa.
W. L. McLaren . . . . .	" " . . . . .	Perth.
John Mahon . . . . .	" " . . . . .	Rideau Ferry.
Thompson, Donnelly and Gemmill . . . . .	" " . . . . .	Perth.
Kent Bros . . . . .	Frontenac Co . . . . . } Bedford Tp . . . . . }	Kingston.
J. W. Trousdale . . . . .	Frontenac Co . . . . . } Loughboro Tp . . . . . }	Sydenham.
Kingston Feldspar and Mining Co . . . . .	Frontenac Co . . . . . } Loughboro Tp . . . . . }	Kingston.
The Loughboro Mining Co., Ltd . . . . .	" " . . . . .	Sydenham.
Scriven and Whyte . . . . .	" " . . . . .	"
Wood, Solliday and Freeman . . . . .	" " . . . . .	"
The Birch Lake Mining Co . . . . .	" " . . . . .	"
H. & C. Campbell . . . . .	Frontenac Co . . . . . } Bedford Tp . . . . . }	Perth Road.
Quebec :—		
J. B. Gauthier . . . . .	Ottawa Co . . . . . } Villeneuve Tp . . . . . }	Buckingham.
Blackburn Bros . . . . .	Ottawa Co . . . . . } Templeton Tp . . . . . }	Ottawa, Ont.
Wallingford Mica and Mining Co . . . . .	" " . . . . .	"
Wallingford Bros, Ltd . . . . .	" " . . . . .	"
John Stewart . . . . .	Ottawa Co . . . . . } Portland W. . . . . }	East Templeton.
Mr. McElroy . . . . .	" " . . . . .	Davidson Corners, Que.
Laurentide Mica Co., Ltd . . . . .	Ottawa Co . . . . . } Templeton Tp . . . . . }	Hull.
Vavasour Mining Association . . . . .	Hull Tp . . . . .	Ottawa, Ont.
Henry T. Flynn . . . . .	Ottawa Co . . . . . } Hull and Cameron Tps . . . }	Hull.
R. McConnell . . . . .	Ottawa Co . . . . . } Hull and Wright Tps . . . }	Ottawa, Ont.
Kent Bros . . . . .	Ottawa Co . . . . . } Hull and Wright Tps . . . }	Kingston, Ont.
Emile Joanis . . . . .	Ottawa Co . . . . . } Egan Tp . . . . . }	Maniwaki.
O'Brien & Fowler . . . . .	Ottawa Co . . . . . } E. Portland Tp . . . . . }	Cummings Bridge, Ont.
W. Argall . . . . .	Argenteuil Co . . . . . } Wentworth Tp . . . . . }	Laurel.
W. L. Parker . . . . .	Labelle Co . . . . . } Biglow Tp . . . . . }	Buckingham.

## MINERAL PIGMENTS.

Under this heading is included the production of ochres and barytes.

### OCHRES.

The production of ochres in 1910 included 1,813 tons, valued at \$27,185, or an average of about \$15 per ton, used for paint manufacture; and 3,000 tons, valued at \$6,000, shipped to gas works throughout Canada, a total production of 4,813 tons, valued at \$33,185. The production has varied but slightly during the past nine years.

The ochre used for the manufacture of paints is calcined and ground at the place of production, while that used for the purification of illuminating gas is shipped crude to gas companies.

Statistics of production since 1886 are shown in Table 1.

MINERAL PIGMENTS.—TABLE 1.

### Annual Production of Ochres and Iron Oxides.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	350	2,350	1899.....	3,919	20,000
1887.....	485	3,733	1900.....	1,966	15,398
1888.....	397	7,900	1901.....	2,233	16,785
1889.....	794	15,280	1902.....	4,955	30,495
1890.....	275	5,125	1903.....	6,266	32,760
1891.....	900	17,750	1904.....	3,925	24,995
1892.....	390	5,800	1905.....	5,105	34,675
1893.....	1,070	17,710	1906.....	6,758	36,125
1894.....	611	8,690	1907.....	5,828	35,570
1895.....	1,339	14,600	1908.....	4,746	30,440
1896.....	2,362	16,045	1909.....	3,940	28,093
1897.....	3,905	23,560	1910.....	4,813	33,185
1898.....	2,226	17,450			

The working of ochre deposits is practically confined in Canada to one district, situated between Champlain and Three Rivers, in the province of Quebec, a short distance back from the shore of the St. Lawrence river.

Numerous deposits of ochre are found in the province of Quebec, but are not worked at present. In Ontario small quantities of ochre are occasionally mined from a deposit situated near Campbellville, but no production has been reported for two years past.

The following are the firms which are mining ochres in Canada:—

The Canada Paint Company, Montreal, Que.

The Champlain Oxide Company, Three Rivers, Que.

Thos. H. Argall, Three Rivers, Que.

Ontario Mineral Paint Company, Campbellville, Ont.

# MINERAL PIGMENTS.—TABLE 2.

## Imports of Ochres.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	571,454	6,544	1896.....	1,159,494	16,954
1881.....	677,115	8,972	1897.....	1,504,044	18,504
1882.....	731,526	8,202	1898.....	2,126,592	26,307
1883.....	898,376	10,375	1899.....	2,444,698	31,092
1884.....	533,416	6,398	1900.....	2,474,537	32,017
1885.....	1,119,177	12,782	1901.....	2,092,067	27,267
1886.....	1,100,243	12,267	1902.....	2,530,743	33,909
1887.....	1,460,128	17,067	1903.....	3,215,346	42,243
1888.....	1,725,460	17,664	1904.....	2,767,580	36,636
1889.....	1,342,783	12,994	1905.....	3,122,690	35,887
1890.....	1,394,811	14,066	1906.....	4,321,530	57,397
1891.....	1,528,696	20,550	1907 (9 months).....	2,926,528	39,675
1892.....	1,708,645	22,908	1908.....	3,749,132	39,923
1893.....	1,968,645	23,134	1909.....	2,122,781	27,540
1894.....	1,358,326	18,951	1910.....	3,683,344	44,190
1895.....	793,258	12,048			

	Duty.	1909.		1910.	
		Lbs.	\$	Lbs.	\$
Ochres and ochrey earths and raw siennas.....	20 %	1,203,276	13,164	1,988,758	21,426
Oxides, dry fillers, fireproofs, umbers and burnt siennas N.E.S.....	25 %	919,505	14,376	1,694,586	22,764
Total.....		2,122,781	27,540	3,683,344	44,190

# MINERAL PIGMENTS.—TABLE 3.

## Exports of Mineral Pigments, Iron Oxides, &c.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1897.....	512	7,706	1904.....	416	7,260
1898.....	283	4,227	1905.....	353	7,704
1899.....	308	5,408	1906.....	139	2,379
1900.....	651	7,154	1907.....	191	10,043
1901.....	401	8,233	1908.....	125	4,850
1902.....	352	6,182	1909.....	658	7,956
1903.....	676	12,770	1910.....	1,746	29,839

**BARYTES.**

No production of barytes during 1910, has been reported. The shipments in 1909, were 179 tons, valued at \$1,120, the mineral having been taken out in development work at Five Islands, Colchester county, Nova Scotia. This property is owned by the Messrs. Soley Bros. of Boston, who report the mine in a fair state of development, with several thousand tons of ore in sight.

Statistics of production since 1885, are shown in Table 4, and imports in Table 5. Statistics of imports of barytes have not been separately shown by the Customs Department since 1890, but the imports of blanc fixe (artificial sulphate of barium), and satin white, during the twelve months ending March, 1910, amounted to 629 tons, valued at \$14,735, and during the twelve months ending March, 1911, 1,212 tons, valued at \$26,797.

**MINERAL PIGMENTS.—TABLE 4.****Annual Production of Barytes.**

Calendar Year.	Tons.	Value.	Average Value.	Calendar Year.	Tons.	Value.	Average Value.
		\$	\$ cts.			\$	\$ cts.
1885.....	300	1,500	5 00	1898.....	1,125	5,533	4 92
1886.....	3,864	19,270	4 98	1899.....	720	4,402	6 11
1887.....	400	2,400	6 00	1900.....	1,337	7,605	5 69
1888.....	1,100	3,850	3 50	1901.....	653	3,842	5 89
1889.....				1902.....	1,096	3,957	3 61
1890.....	1,842	7,543	4 09	1903.....	1,163	3,931	3 38
1891.....				1904.....	1,382	3,702	2 68
1892.....	315	1,260	4 00	1905.....	3,360	7,500	2 23
1893.....				1906.....	4,000	12,000	3 00
1894.....	1,081	2,830	2 62	1907.....	1,344	3,000	2 23
1895.....				1908.....	4,312	19,021	4 41
1896.....	145	715	4 93	1909.....	179	1,120	6 26
1897.....	571	3,060	5 36	1910.....			

**MINERAL PIGMENTS.—TABLE 5.****Imports of Barytes.**

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$
1880.....	2,230	1,525	1886.....		62
1881.....	3,740	1,011	1887.....	379	676
1882.....	497	303	1888.....	236	214
1883.....		185	1889.....	1,332	987
1884.....		229	1890.....	1,322	978
1885.....	7	14			

**Exports of Barytes.**

Calendar Year.	Cwt.	Value.	Calendar Year.	Cwt.	Value.
		\$			\$
1901.....	208	3,820	1906.....	1,350	6,750
1902.....			1907.....	550	2,750
1903.....	406	368	1908.....	3,509	13,690
1904.....	13,080	5,178	1909.....		
1905.....	34,488	14,343	1910.....	5	150

## MINERAL WATER.

The statistics of production given herewith represent, as usual, as closely as can be obtained, the value of mineral water shipped from mineral springs in bottles, barrels, or other containers, and do not include any estimate for the value of mineral water used at the spring for drinking or bathing purposes, nor are the natural pure spring waters included, of which a considerable quantity is sold in bottled form.

The production in 1909, was valued at \$175,173, and represented over 450,000 gallons. The production in 1910, was valued at \$199,563, as compared with \$175,173 in 1909.

Statistics of production and imports are shown in tables following:—

MINERAL WATERS.—TABLE 1.

### Annual Production.

Calendar Year.	Gals.	Value.	Calendar Year.	Gals.	Value.	Calendar Year.	Gals.	Value.
		\$ -			\$			\$
1888.....	124,850	11,456	1896.....	706,372	111,736	1903.....		100,000
1889.....	424,600	37,360	1897.....	749,691	141,477	1904.....		100,000
1890.....	561,165	66,031	1898.....	555,000	100,000	1905.....		100,000
1891.....	427,485	54,268	1899.....		100,000	1906.....		100,000
1892.....	640,380	75,348	1900.....		75,000	1907.....		136,020
1893.....	725,096	108,347	1901.....		100,000	1908.....		151,953
1894.....	767,460	110,046	1902.....		100,000	1909.....		175,173
1895.....	739,382	126,048				1910.....		199,563

MINERAL WATERS.—TABLE 2.

### Imports.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	41,797	1890.....	71,521	1900.....	30,343
1881.....	55,763	1891.....	15,721	1901.....	40,802
1882.....	57,953	1892.....	17,913	1902.....	91,871
1883.....	49,546	1893.....	27,909	1903.....	108,130
1884.....	48,613	1894.....	28,130	1904.....	137,304
1885.....	55,864	1895.....	27,879	1905.....	161,790
1886.....	47,006	1896.....	32,674	1906.....	178,639
1887.....	52,989	1897.....	22,142	1907 (9 months)...	143,416
1888.....	54,891	1898.....	33,314	1908.....	153,831
1889.....	66,331	1899.....	38,046	1909.....	159,221
				1910.....	188,559



	1909.		1910.	
	Gals.	\$	Gals.	\$
Mineral waters, natural, not in bottle. Duty free .....	4,445	1,030	2,930	431
Mineral and aerated waters ..... " 20 per cent .....		158,191		188,128
Total... ..		159,221		188,559

Following is a list of mineral water producers:—

Operator.	Location of Spring.	Address.
The Havelock Mineral Spring Co. Ltd.....	Havelock Springs, N.B. ....	Havelock Springs, N.B.
The St. Leon Waters, Ltd.....	St. Leon, Que, .....	Toronto, 12 Wellington St.
Radnor Water Co.....	Radnor Forges, Que. ....	Montreal, Que.
Abenakis Springs Hotel Co....	Yamaska Co., Que.....	Abenakis Springs, Que.
Louis L'Heureux.....	Nancy, Que.....	Quebec, Que.
Gurd & Co., Ltd.....	Varenes, Que.....	Montreal, Que.
Caledonia Springs Co., Ltd.....	Caledonia Springs, Ont.....	Montreal, Que.
Lyall, Trenholme & McDonnell.	Caledonia Springs, Ont. ....	Montreal West, Que.
Canada Mineral Waters, Ltd...	Clarence, Ont.....	Toronto, Ontario.
Arthur Belanger.....	Prescott Co. ....	Papineauville, Que.
Thos. L. Boyd.....	Carlsbad, Ont.....	Carlsbad Springs, Ont.
Beck & Frank.....		Southampton, Ont.
Sanitaris Ltd.....	Pakenham, Ont.....	Arnprior, Ont.
Gurd & Co., Ltd.....	Caledonia.....	Montreal, Que.
Halcyon Hot Springs Sanitarium	Arrow Lake.....	Halcyon Hot Springs, B.C.
St. Leon Hot Springs .....	Upper Arrow Lake .....	St. Leon Hot Springs, B.C.

## NATURAL GAS.

The total value of the production of natural gas in Canada in 1910, was according to returns received, \$1,346,471, as compared with a value of \$1,207,-029 in 1909, and \$1,012,660 in 1908.

The quantity used in 1910, was about 8,000,000 M feet, while in 1909, the quantity used was estimated as somewhat in excess of 5,600,000 M. feet, and on this basis an apparent increase in production is shown of about 43 per cent.

The value of the production in Ontario in 1910, was returned as \$1,271,303. and in Alberta \$75,168. In 1909, the Ontario production was valued at \$1,145,307, and that of Alberta \$61,722.

The value of the gas as reported by producers varies all the way from 5 cents to 30 cents per M. feet. These prices do not in all ways represent what the consumer has to pay. In many cases in Ontario, for instance, the gas will pass through the pipe lines of several companies before reaching the ultimate consumer.

In estimating the value of the production of gas, an endeavour has been made in all cases to obtain the value of the gas received by the owner of the gas wells for gas sold.

The annual value of the production of natural gas is shown in Table 1.

NATURAL GAS.—TABLE 1  
Annual Production since 1892.

Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$
1892 .....	150,000	1902 .....	195,992
1893 .....	376,233	1903 .....	202,210
1894 .....	313,754	1904 .....	328,376
1895 .....	423,032	1905 .....	379,561
1896 .....	276,301	1906 .....	583,523
1897 .....	325,873	1907 .....	815,032
1898 .....	322,123	1908 .....	1,012,660
1899 .....	387,271	1909 .....	1,207,029
1900 .....	417,094	1910 .....	1,346,471
1901 .....	339,476		

Returns received showed 815 producing wells in Ontario, of which 174 were completed during the year. Thirty non-producing wells were also drilled during 1910.

In this province the three principal producing fields are known as the Welland county, the Haldimand and Norfolk, and the Essex-Kent. The gas is used for lighting, heating and manufacturing quite generally throughout the district in which it is available. Formerly considerable quantities of gas were exported to Detroit and Buffalo, adjacent respectively to the Essex

and Welland fields, but this export has now ceased. Under the provisions of Chap. 16, 6-7 Edward VII., entitled: 'An Act to regulate the exportation of electric power and certain liquids and gases,' assented to April 27, 1907, the export of natural gas is prohibited except under special license issued by the Governor in Council.

In order to consume the supply of natural gas, and as far as possible prevent its waste, the Ontario Legislature in 1908, passed an 'Act to prevent the wasting of natural gas and to provide for the plugging of all abandoned wells,' (Edward VII., Chapter 47), by which power was conferred upon inspectors appointed under the Act, to enforce the stoppage of waste. The Supplementary Revenue Act, 1907 (Ontario Statutes), also contained provisions which have been even more effective than those of the first mentioned Act, and the enforcement of these laws has, according to the Bureau of Mines, reduced the waste of gas to a minimum.

In Alberta, while the commercial use of gas is confined principally to Medicine Hat and vicinity, the existence of natural gas in large quantities has been found over a wide area.

Dr. Ries in his summary report of the Geological Survey incidentally refers to the Medicine Hat gas field as follows:—

"The Medicine Hat gas field continues to yield steadily, and wells are located as far from Medicine Hat as Red Cliff in one direction, and Dunmore Junction (now Coleridge) in the other, but the limits of the field are not definitely known.

"According to Mr. A. K. Grimmer, city engineer of Medicine Hat, about eighteen wells have been drilled at this locality, of which about eight were sunk by the city. Of the latter group three had a depth of 1,000 feet, while the others varied from 300 to 650 feet. The deeper ones show a pressure of about 650 pounds per square inch. There are three important wells from which the city is drawing its supply, located as follows:—

"(1.) Corner Main street and West Allowance: 1,000 feet deep, 4½-inch casing, 550 pounds capped pressure; volume, 1,000,000 cubic feet per twenty-four hours.

"(2.) Corner North River street and Third Avenue: 1,000 feet deep, 6-inch casing, 560 pounds capped pressure; volume, 1,250,000 cubic feet per twenty-four hours.

"(3.) On Bridge street, known as Big Chief: 1,000 feet deep, 6-inch casing, 560 pounds capped pressure; volume, 3,000,000 cubic feet per twenty-four hours.

"In addition to this the city has four wells to a depth of 700 feet, and the private wells in the city are as follows:

"(1.) Central Canada Packing Company: 750 feet deep, 2-inch casing. This is a wet well, was never in good condition, and is not in use.

"(2.) C. Colter, Second avenue: 700 feet deep, 3-inch casing, and 270 pounds pressure when capped.

"(3.) C. Colter, Main street: 400 feet deep, 3-inch casing, and 100 pounds pressure when capped. Not in use.

"(4.) H. Yuill, South Railway street: 850 feet deep, 4½-inch casing, and 270 pounds pressure when capped.

"(5.) Canadian Pacific Railway: 1,000 feet deep, 6-inch casing, with 2-inch tube and packer. This has a pressure of 560 pounds when capped, and a volume of 1,250,000 cubic feet in twenty-four hours.

"(6.) Hargraves well, at end of highway bridge in city: this well is 1,042 feet, has a pressure of 560 pounds when capped, and a discharge of 2,800,000 cubic feet in twenty-four hours.

"On May 31, 1910, the city began drilling a well at a point 2 miles east of Medicine Hat, in the N.E. ¼ of N.E. ¼ of sec. 30, tp. 13, R. 5, W. 4th. This well has a diameter of 10-inch casing, and a depth of 937 feet. It was completed August 30, after striking a flow of gas, with a pressure of 560 pounds at the end of twenty-four hours. A small flow of gas was struck at 550 feet, and continued down to 660 feet.

"This well has been turned over to a manufacturing industry, and the gas will be used for blast furnace purposes."

The superintendent of gas for Medicine Hat reports early in 1911, that the city of Medicine Hat has let contracts for two additional wells 1,000 feet deep to finish 10-inch casing, one of these at time of writing was down 400 feet; he also states the "Attawana Estate," just north of the city, has finished a 6-inch hole with a capped pressure of 560 pounds.

The Canadian Pacific railway, which during the past few years has been doing a great deal of drilling in search of oil and gas at various points in central Alberta, completed two wells during 1910, located respectively at Brooks and Bassano, between Medicine Hat and Calgary. This company has now six completed flowing or producing wells located at Medicine Hat, Dunmore Junction, Suffield, Bow Island, Brooks and Bassano. Two other wells are now being drilled by the same company at Bow Island. The rock pressure in the completed wells varies from 300 to 800 pounds per square inch, and the flow of gas from one-quarter million to ten million cubic feet per twenty-four hours.

Natural gas rights in Manitoba, Saskatchewan, Alberta, the Northwest Territories, the Yukon, etc., are the property of the Crown, and their disposal is now subject to the regulations approved by Order in Council dated the 11th day of March, 1910.

These regulations provide for a rental of 25 cents an acre for the first year and 50 cents an acre each subsequent year, lease to be for twenty-one years, renewable on conditions, and no applicant to be allowed to lease the gas rights under an area of more than 1,920 acres.

In the province of New Brunswick active drilling operations have been carried on by the Maritime Oil Fields, Ltd., of Moncton, in the Stony Creek district of Albert county. The company reports 11 producing wells, of which 10 were completed during 1910, two non-producing wells were also completed,



during the same year. No gas has been sold, but during the year gas has been used entirely for power for drilling purposes, and it is proposed to pipe the gas to Moncton. The eleven producing wells are said to vary from 30 pounds to 600 pounds rock pressure per square inch, and to have an aggregate flow of about 40,000,000 cubic feet per day. The company is continuing drilling operations in the same district, two wells being in course of sinking at the time of reporting.

Following is a list of the principal firms operating natural gas wells:—

Operator.	Location of Wells.	Address.
New Brunswick—		
Maritime Oil Fields, Ltd.,.....	Albert Co .....	Moncton.
Ontario—		
Provincial Natural Gas Co.,.....	Welland Co.....	Niagara Falls.
Bertie Natural Gas Co.,.....	" Bertie Tp.....	Ridgeway.
The United Gas Companies, Ltd.,.....	" Wainfleet Tp.....	St. Catharines.
Welland Co. Lime Works Co., Ltd.....	Welland Co.....	Port Colborne.
	Wainfleet Tp.....	
The Ont. Iron & Steel Co., Ltd.....	Welland Co.....	Welland.
	Crowland & Humberstone Tps.....	
Sterling Gas Co., Ltd.....	Welland Co.....	Port Colborne.
	Humberstone Tp.....	
The Port Colborne Welland Natural Gas Co.,.....	Haldimand Co.....	"
	Oneida & Caledonia Tps.....	
Producers Natural Gas Co., Ltd. ....	Haldimand Co.....	Hamilton.
	Rainham & Walpole Tps.....	
Canboro Natural Gas Co., Ltd.....	Haldimand Co.....	Canboro.
	Canboro Tp .....	
Dominion Natural Gas Co., Ltd.....	Haldimand Co.....	Pittsburg.
	& Norfolk Co.....	
Selkirk Gas & Oil Co., Ltd... ..	Haldimand Co.....	Selkirk.
	Rainham Tp.....	
The Cheapside Gas Co.....	Haldimand Co.....	Cheapside.
	Cheapside Tp.....	
The Fisherville Gas Co.....	Haldimand Co.....	"
	Cheapside Tp.....	
The Holmes Gas Co.....	Haldimand Co.....	Selkirk.
	Rainham & Walpole Tps....	
David E. Hoover,.....	Haldimand Co. ....	"
Jas. H. Hoover,.....	" .....	"
Alfred Lamb.....	Haldimand Co.....	"
	Walpole Tp.....	
Walter B. Lamb,.....	Haldimand Co.....	Nanticoke.
Aldrich Gas & Oil Co., Ltd.....	" .....	Selkirk.
Midfield Natural Gas Co .....	Haldimand Co.....	Hamilton.
	N. Cayuga Tp.....	
Nanticoke Natural Gas Co., Ltd.....	Haldimand Co.....	Nanticoke.
	Walpole Tp.....	
The Volcanic Oil & Gas Co., Ltd. ....	Kent Co.....	Niagara Falls.
	E. Tilbury & Romney Tps...	
Leamington Oil Co., Ltd.....	Kent Co.....	Detroit, 1309.
	Mersea Tp.....	
Beaver Oil & Gas Co., Ltd.....	Kent Co .....	Brantford.
	Mersea & Romney Tps.....	
Maple City Oil & Gas Co., Ltd.....	Kent Co .....	Chatham.
	E. Tilbury Tp.....	
Ridgetown Fuel Supply Co., Ltd.....	Kent Co.....	Ridgetown.
	Raleigh Tp.....	



Operator.	Location of Wells.	Address.
Standard Natural Gas Co. Ltd.....	Kent Co. ....	Brantford.
Oxford Oil & Gas Co., Ltd.....	Oxford Co. ....	"
Alberta—	E. Zorra Tp. ....	"
City of Medicine Hat Gas Commission...	City of Medicine Hat.....	Medicine Hat.
Redcliff Brick Co. ....		"
Attawana Estate.....	N. of City of Medicine Hat...	"
	Medicine Hat.....	"
Canadian Pacific Railway.....	Dunmore Junction.....	"
	Bow Island, Brooks.....	"
	Bassano, &c.,.....	"
Prairie Fuel Gas Co. ....		Lethbridge.

## PEAT.

The production of peat fuel in Canada in 1910, was confined to two bogs, viz.: that at Alfred, Ontario, operated as an experimental or demonstration plant by the Dominion Department of Mines, and the bog near Farnham, Que., operated by the Canada Fertilizer Company, Limited. The total shipments were about 841 tons, valued at \$2,604, of which the greater part was from the Alfred bog. Part of the product of the Alfred bog was used in the Department's fuel testing station at Ottawa, and the balance sold locally at the bog and in Ottawa, where it was greatly in demand, proving an excellent fuel, particularly for grates and cook stoves. The commercial production of peat fuel in Canada cannot be said as yet to have become an established industry, the total production during the past eleven years having been only 4,560 tons, the yearly production being as follows:—

	Tons.	Valus.
1900. . . . .	400	\$1,200
1901. . . . .	220	600
1902. . . . .	475	1,663
1903. . . . .	1,100	3,300
1904. . . . .	800	2,400
1905. . . . .	80	260
1906. . . . .	474	1,422
1907. . . . .	50	200
1908. . . . .	60	180
1909. . . . .	60	240
1910. . . . .	841	2,604

The Mines Branch has given special attention to the subject of the development of Canada's resources in her peat bogs, and a number of publications have already been issued including:

Peat and Lignite: Their Manufacture and Uses in Europe, by Erick Nystrom, M.E., 1908.

Investigation of the Peat Bogs and Peat Industry of Canada, 1909-1910: Bulletin No. 1, by Erick Nystrom, M.E., and A. Anrep, Jr.

Investigation of the Peat Bogs and Peat Industry of Canada, 1909-1910; to which is appended Mr. Alf. Larson's paper on Dr. M. Ekenberg's Wet-Carbonizing Process: from Teknisk Tidskrift, No. 12, December 26, 1908—translations by Mr. A. Anrep, Jr., also a translation of Lieut. Ekelund's Pamphlet entitled 'A Solution of the Peat Problem,' 1909, describing the Ekelund Process for the Manufacture of Peat Powder, by Harold A. Leverin, Ch. E. Bulletin No. 4—A. Anrep, Peat Expert. (Second Edition, enlarged.)

### Use of Peat Moss for Litter.

During 1910, about 50 tons of peat moss were cut by Mr. W. J. Kerr, of New Westminster, B.C., and sold at about \$20 per ton for use as stable bedding. Mr. Kerr reports that there are many acres of this moss and peat in the Fraser valley. On Lulu Island between the North Arm and the Main Channel of the Fraser river, also on the north side of the Fraser river, between New Westminster and the Pacific ocean, and on the south side of the Fraser river, between New Westminster and the Pacific, farmers and owners of the land are putting it under cultivation by digging great ditches and allowing its moss to dry and then burning it off.

## PETROLEUM.

The production of crude petroleum in Canada has decreased rapidly during the past three years, and the output in 1910 was less than half that of 1907. Estimated on the basis of bounty payments, the production in 1910 was 315,895 barrels, valued at \$388,550, or an average of \$1.23 per barrel, as compared with 420,755 barrels, valued at \$559,604, or an average of \$1.33 per barrel in 1909. With the exception of 51,975 gallons in 1910, and 3,328 gallons in 1909, produced in New Brunswick, the output was entirely from the Ontario oil fields.

In 1904 an Act was passed by the Dominion government, providing for the payment of a bounty of 1½ cents per gallon on crude petroleum produced from wells in Canada. The bounty was continued during 1910 under the 'Petroleum Bounty Act, 1909,' which provides for the payment of bounty on crude petroleum produced from oil shales mined in Canada, as well as on oil from wells in Canada. Payments are made on claims submitted by the producers of crude oil to the Minister of Trade and Commerce. These claims have to be substantiated as to quantity by the certificate of the receiving stations, tanking companies, refiners or other purchasers, as well as by the supervising officers of the Department of Trade and Commerce.

The bounty paid on the crude petroleum produced gives, therefore, as accurate a basis as is available for a reliable statement of the annual production.

Table 1, following, shows the production of crude oil in Canada since 1901, in barrels of 35 gallons, together with the total value and average price per barrel.

PETROLEUM.—TABLE 1.

Annual Production of Crude Petroleum since 1901.

Year.	Barrels of 35 Gallons.	Value.	Average Price Per Barrel.
		\$	\$ cts.
1901.....	622,392	1,008,275	1 620
1902.....	530,624	951,190	1 792
1903.....	486,637	1,048,974	2 155
1904.....	503,474	935,895	1 838
1905.....	634,095	856,028	1 350
1906.....	569,753	761,760	1 337
1907.....	788,872	1,057,088	1 340
1908.....	527,987	747,102	1 415
1909.....	420,755	559,604	1 33
1910.....	315,895	388,550	1 23

The figures for the years 1905 to 1910, are deduced from the bounty paid by the federal government, whereas the production for the years 1901 to 1904, is based on direct returns received from refineries and producers. Further details of these figures are given below in tabular form:—

## Production of Crude Oil, 1901 to 1904, based on Direct Returns.

Crude Oil.	1901.	1902.	1903.	1904.
	Bls.	Bls.	Bls.	Bls.
Received at refineries.....	508,677	443,333	410,280	455,074
Direct sales for industrial purposes.....	113,715	87,291	76,357	48,400
Total sales of crude oil.....	622,392	530,624	486,637	503,474
Total sales in gallons.....	21,783,720	18,571,840	17,032,295	17,621,590

## Production of Petroleum estimated on the basis of the bounty of 1½ cents per gallon, paid by the Dominion Government, 1905 to 1910.

Petroleum.	Bounty Paid.	Production of Crude Oil Represented.	
	\$	In Gallons.	In Barrels.
1905.....	332,900	22,193,336	634,095
1906.....	299,120	19,941,357	569,753
1907.....	414,158	27,610,526	788,872
1908.....	277,193	18,479,547	527,987
1909.....	220,897	14,726,433	420,755
1910.....	165,845	11,056,337	315,895

For the years previous to 1901, the production of crude oil was deduced from government inspection returns by assuming a ratio of crude to refined. The statistics of production, on this basis, for the years 1881 to 1900, are given in Table 2.

PETROLEUM.—TABLE 2.

## Canadian Oils and Naphtha inspected, and corresponding quantities of Crude Oil.

Calendar Year.	Refined Oils Inspected.	Crude Equivalent Calculated.	Ratio of Crude to Refined.	Equivalent in Barrels of 35 Gallons.	Average Price Per Barrel of Crude.	Value of Crude Oil.
	Gals.	Gals.			\$ cts.	\$
1881.....	6,457,270	12,914,540	100·50	368,987	.....	.....
1882.....	6,135,782	13,635,071	100·45	389,573	.....	.....
1883.....	7,447,648	16,550,328	100·45	472,866	.....	.....
1884.....	7,993,995	19,984,987	100·40	571,000	.....	.....
1885.....	8,225,882	20,564,705	100·40	587,563	.....	.....
1886.....	7,768,006	20,442,121	100·38	584,061	0 90	525,655
1887.....	9,492,588	24,980,494	100·38	713,728	0 78	556,708
1888.....	9,246,176	24,332,042	100·38	695,203	1 02½	713,695
1889.....	9,472,476	24,664,144	100·38	704,690	0 92½	653,600
1890.....	10,174,894	26,776,037	100·38	795,030	1 18	902,734
1891.....	10,065,463	26,435,430	100·38	755,298	1 33½	1,010,211
1892.....	10,370,707	27,291,334	100·38	779,753	1 26½	984,438
1893.....	10,618,804	27,944,221	100·38	798,406	1 09½	874,255
1894.....	11,027,082	29,018,637	100·38	829,104	1 00½	835,322
1895.....	10,674,232	25,414,838	100·42	726,138	1 49½	1,086,738
1896.....	10,684,284	25,438,771	100·42	726,822	1 59	1,155,647
1897.....	10,434,878	24,844,995	100·42	709,857	1 42½	1,011,546
1898.....	11,148,348	26,543,685	100·42	758,391	1 40	1,061,747
1899.....	11,927,981	28,399,955	100·42	808,570	1 48½	1,202,020
1900.....	13,428,422	24,867,449	100·54	710,498	1 62	1,151,007



An estimate of the production of the various Ontario oil fields during the past four years has been kindly furnished by the Imperial Oil Company, and is shown in the next table.

The falling off in production during the past three years, it will be observed, has been common to all the important fields, although the decrease in Tilbury and Raleigh and Romney has been most pronounced.

The figures do not agree in totals with the statistics of production published in previous tables, but they will probably serve to show the relative importance of the several fields.

### Production of Ontario Oil Fields, 1907, 1908, 1909, and 1910.

District.	1907.	1908.	1909.	1910.
	Bls.	Bls.	Bls.	Bls.
Dutton.....	14,698	12,268	10,052	7,860
Leamington (Staples, Comber, and Blytheswood).....	16,210	18,117	9,367	248
Bothwell.....	40,556	39,820	38,707	36,615
Richardson (Chatham) includes Beakely.....	941	2,882	2,923	1,698
Thamesville.....	1,139	853	710	141
Moore township.....	32,720	25,667	18,033	14,614
Oil Springs.....	55,813	61,252	60,868	55,508
East Tilbury and Raleigh (including Pardo's Siding & Sandison).....	344,358	170,589	115,862	60,416
Romney.....	49,783	11,165	1,082	1,070*
Petrolea, (includes all districts not enumerated above).....	206,285	171,019	156,581	129,372
	762,503	513,632	414,185	307,533

\* Denotes production from Onondaga in 1910.

Another statement of production by districts is furnished by Mr. W. J. Hainey, the supervisor of petroleum bounties, as follows, the classification being somewhat different from that shown above, but the total agreeing more closely with those given in Table 1.

Field.	1906.	1907.	1908.	1909.	1910.
	Bls.	Bls.	Bls.	Bls.	Bls.
Lambton.....	377,286	304,212	265,368	243,123	205,456
Tilbury and Romney.....	106,992	411,588	201,286	124,003	63,058
Bothwell.....	44,827	42,727	39,228	38,092	36,998
Leamington.....	39,655	6,135	9,334	5,929	141
Dutton.....	19,376	14,977	13,743	9,513	7,752
Thamesville.....	175	237			
Comber.....	651				
Onondaga (Brant Co).....					1,005
Total.....	588,962	779,876	528,959	420,660	314,410

The oil refineries of Canada, of which there are four, viz.: the Imperial Oil Company, works at Sarnia, head office, Buffalo; the Canadian Oil Company, works at Petrolea, head office, Toronto; the British American Oil Company, works and head office at Toronto; and the Empire Refining Company,



Ltd., works at Wallaceburg, use considerable quantities of imported crude oils. The imports of crude oil,\* the greater part of which was no doubt used by the refiners, were in 1910, 53,603,778 gallons, valued at \$1,639,320, and in 1909, 35,884,103 gallons, valued at \$1,186,400.

All refined illuminating oils, and naphtha manufactured and shipped from Canadian refineries, are inspected by the Inland Revenue Department. The total quantities of these oils inspected during the fiscal year ending March 31, 1910, was 27,535,283.86 gallons, as compared with 23,213,573.62 gallons inspected during the previous fiscal year.

There are three inspection districts, known respectively as the London, Toronto and Windsor districts, the first mentioned covering the refinery plants at Sarnia and Petrolea, the second the Toronto refinery, and the third the Wallaceburg refinery.

The following tables showing the quantities of refined illuminating oils and naphtha inspection in the several districts are quoted from the annual report of the Department of Inland Revenue.

### Inspection of Petroleum.

RETURN of Inspected Petroleum and Naphtha shipped from Refineries, During the Fiscal Year ended March 31, 1911.

Divisions.	Petroleum.	Naphtha.	Totals.
	Gals.	Gals.	Gals.
London, Ont.....	19,632,453.50	5,602,772.02	25,235,225.52
Toronto, Ont.....	947,355.95	792,366.39	1,739,722.34
Windsor, Ont.....	437,819.00	122,517.00	560,336.00
	21,017,628.45	6,517,655.41	27,535,283.86

COMPARATIVE Statement of Inspected Petroleum and Naphtha Shipped from Refineries, during the Fiscal Years ended March 31, 1910 and 1911.

Provinces.	Petroleum.	Naphtha.	Totals.
1910.			
Ontario.....	19,100,424.16	4,113,149.46	23,213,573.62
1911.			
Ontario.....	21,017,628.45	6,517,655.41	27,535,283.86

The exports of oil from Canada are very small, the available statistics being shown in Table 3. During 1910, the only exports recorded were 2,818 gallons of refined oil, valued at \$462.

\* Petroleum crude, fuel and gas oils, specific gravity, .8235.

## PETROLEUM.—TABLE 3.

## Exports of Crude and Refined Petroleum, 1881-1910.

Calendar Year.	CRUDE OIL.		REFINED OIL.		TOTAL.	
	Gals.	Value.	Gals.	Value.	Gals.	Value.
		\$	\$	\$		\$
1881.....					501	99
1882.....					1,119	286
1883.....					13,283	710
1884.....					1,095,090	30,168
1885.....					337,967	10,562
1886.....					241,716	9,855
1887.....					473,559	13,831
1888.....					196,602	74,542
1889.....					235,855	10,777
1890.....					420,492	18,154
1891.....	446,770	18,471	585	104	447,355	18,575
1892.....	310,387	12,945	1,146	100	311,533	13,045
1893.....	107,719	3,696	2,196	394	109,915	4,090
1894.....	53,985	2,773	5,297	513	59,282	3,286
1895.....	22,831	1,044	10,237	2,023	33,068	3,067
1896.....	601	101	7,489	999	8,090	1,100
1897.....			342	49	342	49
1898.....	96	4	12,735	3,001	12,831	3,005
1899.....			8,559	859	3,425	859
1900.....	40	2	8,559	394	8,559	2,396
1901.....	14,168	691	375	66	14,543	757
1902.....	400	40	626	146	1,026	186
1903.....	350	15	1,013	190	1,363	205
1904.....	4,207	213	2,126	470	6,333	683
1905.....	35	2	7,228	2,078	7,263	2,080
1906.....	900	141	8,938	1,401	9,838	1,542
1907.....	1,125	102	3,132	575	4,257	677
1908.....			296	71	296	71
1909.....			7,768	934	7,768	934
1910.....			2,818	462	2,818	462

The imports of petroleum and petroleum products have been growing steadily, and during the twelve months ending December 31, 1910, reached a total of 84,629,334 gallons of petroleum oil, crude and refined, valued at \$4,826,745, in addition to 1,362,235 pounds of wax and wax candles, valued at \$80,106. The oil imports included: crude oil, 53,604,053 gallons; refined and illuminating oils, 7,656,727 gallons; gasolene, 16,679,691 gallons; lubricating oils, 4,081,257 gallons; other petroleum products, 2,607,606 gallons.

The imports of oils, crude and refined, during the twelve months ending March, 1910, were 60,017,066 gallons, valued at \$3,442,604, as compared with 51,700,476 gallons, valued at \$3,219,243 in 1909. Details of the imports during the fiscal year 1910, and the calendar year, 1910, are shown in the accompanying Table No. 4.

PETROLEUM.—TABLE 4.

Imports of Petroleum and Products thereof, during the year 1910.

Products.	1910. (12 mos. ending March )		1910. (12 months ending December.)	
	Gals.	Value.	Gals.	Value.
		\$		\$
(a) Petroleum crude, fuel and gas oils (.8235 specific gravity).....	36,947,670	1,188,850	53,603,778	1,639,320
(b) Crude petroleum, gas oils (other than benzine and gasolene).....	3,281	221	275	38
(c) Coal and kerosene, distilled, purified, or refined .....	8,652,285	622,177	7,639,070	494,723
(d) Illuminating oils composed wholly or in part of the products of petroleum, coal, shale, or lignite, costing more than 30 cents per gallon .....	10,385	3,928	17,657	7,641
(e) Lubricating oils composed wholly or in part of petroleum, costing less than 25 cents per gallon .....	2,802,579	387,223	3,272,101	450,884
(f) Products of petroleum, N.O.P .....	2,186,031	211,787	2,607,606	273,364
(g) Lubricating oils, N.O.P .....	764,124	210,872	809,157	267,497
(h) Gasolene.....	8,650,711	817,546	16,679,691	1,693,296
Total.....	60,017,066	3,442,604	84,629,334	4,826,763

(a) Free. (b) Duty 1½c. per gal. (c), (e), and (f) Duty 2½c. per gal. (d) 20 per cent.  
(g) Duty 20 per cent (h) Free.

The total annual imports of petroleum oils and products, excluding the imports of paraffin wax and candles, are shown in Table 5. The imports of paraffin wax are shown in Table 7, and of wax candles in Table 8, while the total imports of crude and manufactured oils, other than illuminating, are shown in Table 6.

PETROLEUM.—TABLE 5.

Imports of Petroleum and Products thereof, years 1880-1910.

Fiscal Year.	Gals.	Value.	Fiscal Year.	Gals.	Value.
		\$			\$
1880.....	687,641	131,359	1896. ....	8,005,891	735,913
1881.....	1,437,475	262,168	1897. ....	8 415,302	697,169
1882.....	3,007,702	398,031	1898. ....	9,074,311	724,519
1883.....	3,086,316	358,546	1899. ....	10,394,208	763,303
1884.....	3,160,282	380,082	1900. ....	9,633,647	864,833
1885.....	3,767,441	415,195	1901. ....	11,082,822	982,640
1886.....	3,819,146	421,836	1902. ....	13,220,005	1,107,207
1887.....	4,290,003	467,003	1903. ....	18,799,312	1,643,371
1888.....	4,523,056	408,025	1904. ....	24,521,115	2,152,623
1889.....	4,650,274	484,462	1905. ....	35,296,332	2,151,514
1890.....	5,075,650	515,852	1906. ....	32,624,410	1,908,177
1891.....	5,071,386	498,330	1907 (9 mos.) .....	23,645,861	1,480,261
1892.....	5,649,145	475,732	1908. ....	40,213,542	2,577,059
1893.....	6,002,141	446,389	1909. ....	51,700,476	3,219,243
1894.....	6,597,108	439,988	1910. ....	60,017,066	3,442,604
1895.....	7,577,674	525,372			

## PETROLEUM.—TABLE 6.

## Imports of Crude and Manufactured Oils, other than Illuminating, 1881-1910.

Fiscal Year.	Gals.	Fiscal Year.	Gals.
1881.....	960,691	1896.....	1,079,965
1882.....	1,656,290	1897.....	802,286
1883.....	1,895,488	1898.....	1,047,026
1884.....	2,017,707	1899.....	1,017,278
1885.....	2,489,326	1900.....	1,406,700
1886.....	2,491,530	1901.....	1,838,966
1887.....	2,624,399	1902.....	2,296,353
1888.....	2,701,714	1903.....	4,316,010
1889.....	2,882,462	1904.....	7,141,109
1890.....	3,054,908	1905.....	25,002,047
1891.....	3,049,384	1906.....	23,365,674
1892.....	3,047,199	1907 (9 mos.).....	16,761,713
1893.....	1,481,749	1908.....	33,915,853
1894.....	1,860,829	1909.....	41,085,997
1895.....	1,106,993	1910.....	51,354,396

The figures for the years from 1881 to 1894, inclusive, represent the total imports of petroleum and products, less the quantity of imported illuminating oils, inspected by the Inland Revenue Department. For 1895 and subsequent years, the table is composed of items other than (c) and (d) of Table 6.

## PETROLEUM.—TABLE 7.

## Imports of Paraffin Wax, 1883-1910.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1883.....	43,716	5,166	1897.....	138,703	7,945
1884.....	39,010	6,079	1898.....	103,570	5,987
1885.....	59,967	8,123	1899.....	92,242	4,025
1886.....	62,035	7,953	1900.....	47,400	3,529
1887.....	61,132	6,796	1901.....	118,848	9,639
1888.....	53,862	4,930	1902.....	225,885	12,750
1889.....	63,229	5,250	1903.....	592,642	28,674
1890.....	239,229	15,844	1904.....	418,967	18,440
1891.....	753,854	50,275	1905.....	81,992	7,795
1892.....	733,873	48,776	1906.....	112,612	9,721
1893.....	452,916	38,935	1907 (9 months).....	55,021	5,922
1894.....	208,099	15,704	1908.....	62,308	8,041
1895.....	163,817	11,579	1909.....	129,631	12,795
1896.....	150,287	10,042	1910.....	429,801	27,296



## PETROLEUM.—TABLE 8.

## Imports of Paraffin Wax Candles, 1880-1910.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	10,445	2,269	1896.....	25,787	4,072
1881.....	7,494	1,683	1897.....	25,114	2,929
1882.....	5,818	1,428	1898.....	60,802	4,427
1883.....	7,149	1,734	1899.....	62,331	5,856
1884.....	8,755	2,229	1900.....	27,663	3,671
1885.....	9,247	2,449	1901.....	44,562	3,588
1886.....	12,242	2,587	1902.....	51,120	5,752
1887.....	21,364	3,611	1903.....	83,377	9,025
1888.....	22,054	2,829	1904.....	83,471	9,078
1889.....	8,038	1,337	1905.....	137,353	15,293
1890.....	7,233	1,186	1906.....	148,808	15,804
1891.....	10,598	2,116	1907 (9 months).....	38,900	5,088
1892.....	9,259	1,952	1908.....	156,934	20,035
1893.....	8,351	1,735	1909.....	110,848	11,806
1894.....	10,818	1,685	1910.....	164,822	20,842
1895.....	19,448	2,541			

Regulations have been adopted by the Dominion government for the disposal of petroleum and natural gas rights, and of tar sands, which are outlined as follows:—

**Petroleum Regulations.**

‘Regulations for the disposal of petroleum and natural gas rights, the property of the Crown, in Manitoba, Saskatchewan, Alberta and Northwest Territories, the Yukon Territory, and within the tract containing three and one-half (3½) million acres of land acquired by the Dominion government from the province of British Columbia, and referred to in sub-section (b) of section 3 of the Dominion Lands Act, approved by Order in Council, dated the 11th day of March, 1910.’

These regulations provide for the leasing of petroleum and gas rights under an area of not more than 1,920 acres to one applicant for a period of twenty-one years, subject to a rental of twenty-five (25) cents an acre for the first year, and fifty (50) cents an acre for each subsequent year.

The lessee is required to have upon the lands leased, within one year of the date of the lease, such machinery as the minister may consider necessary for the carrying on of prospecting operations, and is required to begin boring operations within 15 months of the date of the lease, which shall be continued with reasonable diligence, with a view to the discovery of oil or natural gas.

**Tar Sand Regulations.**

Regulations for the disposal of the tar sands, the property of the Crown in that portion of the province of Alberta lying north of township 80 and



between the 4th and 5th initial meridians, were approved by Order in Council, dated 14th day of February, 1910.

These provide for the leasing of an area not exceeding 1,920 acres to one applicant for a period of twenty-one years, subject to an annual rental of fifty (50) cents per acre.

After the lease has been in existence one year, the lessee may, on one year's notice, be required to begin active operations, and may be required to excavate and produce ready for shipment or treatment, a quantity not exceeding ten tons per annum, for each acre leased. Copies of the full text of the regulations may be obtained from the Department of the Interior.

## PHOSPHATE.

The production of phosphate or apatite in Canada during the past fifteen years, which has averaged only about 1,000 tons per annum, has been obtained almost altogether as a by-product in connection with the mining of mica. The shipments during 1910, were reported as 1,478 tons, valued at about \$12,-578, at the mines, an average of \$8.51 per ton. These shipments were made from properties situated in the townships of Bowman, Hull and Portland East, county of Ottawa, Quebec, and North Burgess township, county of Lanark, Ontario, and were used at Buckingham, Quebec, in the manufacture of phosphorus and of fertilizers.

For a number of years previous to 1892, there was a considerable production of apatite from the district north of Buckingham, the annual output varying from 20,000 tons to 30,000 tons. The introduction of the cheaply mined phosphates of the southern states, however, resulted in the collapse of the Canadian industry, though it was claimed at the time of closing down that there was no diminution in the available supply of mineral.

Statistics of production and exports are shown in Tables 1 and 2, following:—

PHOSPHATE.—TABLE 1.

### Annual Production.

Calendar Year.	Tons.	Value.	Average Value per ton.	Calendar Year.	Tons.	Value.	Average Value per ton.
		\$	\$ cts.			\$	\$ cts.
1886 .....	20,495	304,338	14 85	1899 .....	3,000	18,000	6 00
1887 .....	23,690	319,815	13 50	1900 .....	1,415	7,105	5 02
1888 .....	22,485	242,285	10 77	1901 .....	1,033	6,280	6 07
1889 .....	30,988	316,662	10 21	1902 .....	856	4,953	5 79
1890 .....	31,753	361,045	11 37	1903 .....	1,329	8,214	6 18
1891 .....	23,588	241,603	10 24	1904 .....	817	4,590	5 62
1892 .....	11,932	157,424	13 20	1905 .....	1,300	8,425	6 48
1893 .....	8,198	70,942	8 65	1906 .....	850	6,375	7 50
1894 .....	6,861	41,166	6 00	1907 .....	824	6,018	7 30
1895 .....	1,822	9,565	5 25	1908 .....	1,596	14,794	9 26
1896 .....	570	3,420	6 00	1909 .....	998	8,054	8 07
1897 .....	908	3,984	4 39	1910 .....	1,478	12,578	8 51
1898 .....	733	3,665	5 00				

## PHOSPHATE.—TABLE 2.

## Exports.

Calendar Year.	ONTARIO.		QUEBEC.		TOTALS	
	Tons.	* Value.	Tons.	* Value.	Tons.	* Value.
		\$		\$		\$
1878.....	824	12,278	9,919	195,831	10,743	208,109
1879.....	1,842	20,565	6,604	101,470	8,446	122,035
1880.....	1,387	14,422	11,673	175,664	13,060	190,086
1881.....	2,471	36,117	9,497	182,339	11,968	218,456
1882.....	568	6,338	16,585	302,019	17,153	308,357
1883.....	50	500	19,666	427,168	19,716	427,668
1884.....	763	8,890	20,946	415,350	21,709	424,240
1885.....	434	5,962	28,535	490,331	28,969	496,293
1886.....	644	5,816	19,796	337,191	20,460	343,007
1887.....	705	8,277	22,447	424,940	23,152	433,217
1888.....	2,643	30,247	16,133	268,362	18,776	298,609
1889.....	3,547	38,833	26,440	355,935	29,987	394,768
1890.....	1,866	21,329	26,591	478,040	28,457	499,369
1891.....	1,551	16,646	15,720	368,015	17,271	384,661
1892.....	1,501	12,544	9,981	141,221	11,482	153,765
1893.....	1,990	11,550	5,748	56,402	7,738	67,952
1894.....	1,980	10,560	3,470	29,610	5,450	40,170
1895.....			250	2,500	250	2,500
1896.....	1	5	299	2,990	300	2,995
1897.....	70	450	165	400	235	850
1898.....	21	240	702	8,000	723	8,240
1899.....	215	1,850	93	1,725	308	3,575
1900.....					Nil	Nil
1901.....					6	120
1902.....					70	1,850
1903.....					1	20
1904.....					191	5,348
1905.....					40	1,253
1906.....						
1907.....						
1908.....					1	30
1909.....					895	15,735
1910.....					0	0

\* These values do not compare with those in Table 1; the spot value is adopted for the production, while the exports are valued upon quite a different basis.

There has been some inquiry for phosphate to supply European demand, but the price offered does not seem as yet to be sufficiently high to afford any prospect for the development of trade in this direction. From \$9 to \$10 per ton c.i.f. British ports, is offered for phosphate running 80 per cent phosphoric acid, whereas higher prices than these are now being paid at Buckingham, Que., without attracting sufficient mineral to supply the demand. In January, 1910, Florida "hard rock 77 per cent" was quoted at from \$3.50 to \$6 per ton f.o.b. Florida or Georgia ports.

## PYRITES.

The total shipments of pyrites in 1910, were reported as 53,870 tons, valued as reported by the producers at \$187,064. The shipments include 24,242 tons of copper pyrites from Quebec mines, valued at \$102,162, and 29,628 tons of iron pyrites, valued at \$84,902, from Ontario properties. In 1909, the total shipments were 64,644 tons, being 35,300 tons of copper pyrites from Quebec, and 29,344 tons of iron pyrites from Ontario. The 1908 shipments included 26,598 tons from Quebec and 20,738 tons from Ontario.

The total exports of pyrites from Canada in 1910, are reported by the Customs Department as 30,434 tons, valued at \$110,071, as compared with exports in 1909 of 35,798 tons, valued at \$156,644, and in 1908 of 17,283 tons, valued at \$96,600.

The imports of brimstone and crude sulphur during the calendar year, 1910, were 22,835 tons, valued at \$474,619, as against 22,887 tons, valued at \$458,961 in 1909.

No record is available of the quantity of sulphuric acid manufactured in Canadian acid plants, but the quantity of sulphuric acid imported during the calendar year 1910, according to customs returns was 2,474,802 pounds, valued at \$21,702, as compared with 1,061,986 pounds, valued at \$9,419 imported in 1909.

Statistics of production and exports of pyrites, of imports of brimstone and crude sulphur and of imports of sulphuric acid, are shown in the following tables:—

PYRITES.—TABLE 1.

### Annual Production.

Calendar Year.	Tons, 2,000 lbs.	Value.	Calendar Year.	Tons, 2,000 lbs.	Value.
		\$			\$
1886. ....	42,906	193,077	1899. ....	27,687	110,748
1887. ....	38,043	171,194	1900. ....	40,031	155,164
1888. ....	63,479	285,656	1901. ....	35,261	130,544
1889. ....	72,225	307,292	1902. ....	35,616	138,939
1890. ....	49,227	123,067	1903. ....	33,982	127,713
1891. ....	67,731	203,193	1904. ....	37,180	134,033
1892. ....	59,770	179,310	1905. ....	33,339	125,486
1893. ....	58,542	175,626	1906. ....	42,743	169,990
1894. ....	40,527	121,581	1907. ....	46,243	212,491
1895. ....	34,198	102,594	1908. ....	47,336	224,824
1896. ....	33,715	101,155	1909. ....	64,644	222,812
1897. ....	38,910	116,730	1910. ....	53,870	187,064
1898. ....	32,218	128,872			

## PYRITES.—TABLE 2.

## Imports:—Brimstone and Crude Sulphur.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	1,775,489	27,401	1896.....	6,934,190	63,973
1881.....	2,118,720	36,956	1897.....	8,672,751	87,719
1882.....	2,375,821	40,329	1898.....	38,026,798	373,786
1883.....	2,936,085	36,737	1899.....	24,517,026	265,799
1884.....	2,195,735	37,463	1900.....	21,128,656	215,433
1885.....	2,248,986	35,043	1901.....	23,856,651	270,608
1886.....	2,922,043	43,651	1902.....	24,640,735	325,307
1887.....	3,103,644	38,750	1903.....	24,412,737	259,123
1888.....	2,048,812	25,318	1904.....	19,364,730	204,663
1889.....	2,427,510	34,006	1905.....	23,435,140	242,251
1890.....	4,440,799	44,276	1906.....	43,047,672	436,156
1891.....	3,601,748	46,351	1907 (9 months).....	25,854,615	277,439
1892.....	4,769,759	67,095	1908.....	51,806,739	517,249
1893.....	6,381,203	77,216	1909.....	44,049,172	426,569
1894.....	5,845,463	61,558	1910*.....	42,943,340	430,632
1895.....	4,900,225	56,965			

\*Brimstone, crude or in roll or flour, or sulphur in roll or flour.

## PYRITES.—TABLE 3.

## Exports of Pyrites.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1894.....	8,532	33,205	1903.....	21,067	59,604
1895.....	7,705	38,298	1904.....	18,279	49,911
1896.....	15,002	33,837	1905.....	19,755	55,767
1897.....	15,096	30,812	1906.....	26,050	65,349
1898.....	9,804	26,387	1907.....	25,056	80,139
1899.....	15,599	34,084	1908.....	17,283	96,600
1900.....	17,620	41,182	1909.....	35,798	156,644
1901.....	24,971	57,263	1910.....	30,434	110,071
1902.....	18,584	50,178			

## PYRITES.—TABLE 4.

## Imports of Sulphuric Acid.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
		\$			
1894.....	107,520	1,648	1903.....	102,314	2,332
1895.....	174,605	2,481	1904.....	113,407	2,563
1896.....	114,137	1,430	1905.....	920,804	8,227
1897.....	977,446	8,033	1906.....	822,585	8,558
1898.....	665,344	5,536	1907.....	733,151	6,901
1899.....	165,637	2,427	1908.....	650,095	7,582
1900.....	740,858	7,066	1909.....	241,388	3,298
1901.....	448,608	5,272	1910.....	914,058	8,466
1902.....	420,731	4,626	1911†.....	2,486,992	21,855

† Figures for fiscal year ending March, 1911, are subject to revision.



Following is a list of the firms operating pyrites mines:—

The Eustis Mining Company, Eustis, Que.

The Nichols Chemical Company of Canada, Limited, Sulphide, Ont.

The Canadian Sulphur Ore Company, Limited, Madoc, Ont.

The Northern Pyrites Company, Dinorwic, Ont.

The Northland Mining Company, Limited, London, Ont.

East Canada Smelting Company, Limited, Weedon, Que.

Lake Superior Power Company, Sault Ste. Marie, Ont.

Ontario Sulphur Mines, Limited, Tweed, Ont.

## SALT.

The production of salt in Canada is still confined to the salt fields in southwestern Ontario, although there was at one time a very small production in New Brunswick and Manitoba.

The total sales of Canadian salt in 1910, were 84,092 tons, valued at \$409,624, exclusive of packages, as compared with sales of 84,037 tons, valued at \$415,219 in 1909, showing practically no change in production.

The average number of men employed during the year was reported as 208, and the amount paid in wages \$112,909. The value of the packages used during the year was \$173,446, and stock of salt in manufacturers' hands at the close of the year was reported as 2,474 tons.

Detailed statistics of the production during the past six years, showing the total sales of salt, the value of the sales (exclusive of packages), the values of the packages used, stock in manufactures' hands at the end of each year, number of men employed and wages paid, are given in Table 1, while the total annual production since 1886 is given in Table 2.

SALT.—TABLE 1.  
Detailed Statistics of Production, 1905-1910.

		1905.	1906.	1907.	1908.	1909.	1910.
Sales of salt.....	Tons	67,340	76,762	72,697	79,975	84,037	84,092
Value of salt, (exclusive of packages).....	\$	320,858	329,130	342,315	378,798	415,219	409,624
Value of packages.....	\$	113,004	147,705	149,823	168,019	175,612	173,446
Stock in manufacturer's hands at end of year.....	Tons	5,206	6,365	3,923	5,631	2,671	2,474
Men employed.....	No.	191	210	215	207	185	208
Wages paid.....	\$	83,391	92,000	95,667	95,575	96,116	112,909

SALT.—TABLE 2.  
Annual Production, 1886-1910.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1886.....	62,359	\$ 227,195	1898.....	57,142	\$ 248,639
1887.....	60,173	166,394	1899.....	59,339	254,390
1888.....	59,070	185,460	1900.....	62,055	279,458
1889.....	32,832	129,547	1901.....	59,428	262,328
1890.....	43,754	198,857	1902.....	64,456	292,581
1891.....	45,021	161,179	1903.....	62,452	297,517
1892.....	45,486	162,041	1904.....	69,477	321,778
1893.....	62,324	195,926	1905.....	67,340	320,858
1894.....	57,199	170,687	1906.....	76,720	329,130
1895.....	52,376	160,435	1907.....	72,697	342,315
1896.....	43,960	169,693	1908.....	79,975	378,798
1897.....	51,348	225,730	1909.....	84,037	415,219
			1910.....	84,092	409,624

As will be seen by the above table, the salt industry is slowly but steadily developing; the figures of production for 1910 being the highest yet recorded.

The salt fields of western Ontario are very extensive. The salt beds form part of the Onondaga formation, of Silurian age, and the saliferous horizons underlie a territory extending from Kincardine to Lake Erie, bordering Lake Huron and the Detroit river. This basin measures an extreme length of 150 miles, with a maximum width of 40 miles at the centre and tapering towards the ends. This would cover an area of 2,500 square miles. An idea of the immense deposits of salt contained in this area may be gathered from the fact that a bore hole sunk at Goderich, in Huron county, to a depth of 1,517 feet, went through six beds of salt, ranging in thickness from 6 feet to 35 feet, whereas, at Windsor, in a well 1,672 feet deep, four beds were traversed, one of which is said to measure 250 feet in thickness.

So far, the salt industry of western Ontario is confined to production of salt for the trade, but with such deposits, which are practically inexhaustible, there is a wide field for the establishment of a soda industry. The imports into Canada of the products of the soda industry reach a very high figure, as may be gathered from the following items of importations during the calendar years ending December 31, 1909 and 1910:—

	1909.		1910.	
	Lbs. imported.	Value.	Lbs. imported.	Value.
		\$		\$
Soda, ash, or barilla .....	30,567,464	249,882	35,596,006	306,167
Soda bichromate.....	367,271	21,501	878,777	32,842
Caustic soda in packages, 25 lbs. or more.....	11,100,980	218,728	13,848,170	260,938
Sal soda.....	11,318,633	106,440	9,715,272	72,845
Sulphate of soda.....	1,961,561	7,611	17,728,543	95,054
		604,162		767,846

As at present carried on in western Ontario, the salt industry consists essentially in the production of table, dairy, and coarse salt, and a small quantity of land salt. These are manufactured by forcing water down bore holes sunk to the rock salt bed, through a casing inside of which is a pipe of smaller diameter. A powerful pump forces water down the outer tube, this dissolves the salt, eventually forming large cavities at the bottom of the well, which offer a great surface of salt to the action of the water.

The water forced downwards is charged to saturation in the salt cavity, and, as the rock is not fissured or porous, this brine is forced upwards through the inner tube. After a process of purification and settling, this brine is evaporated either in vacuum pans or in large open air vats, and after passing through mechanical dryers or over drying floors, the salt is ready for the market.

The following are analyses of brines obtained from wells in these salt fields. The figures are for 1,000 parts by weight:—

Analyses of Brines.<sup>1</sup>

	Sodium chloride.	Calcium chloride.	Magnesium chloride.	Sulphate of lime.	Specific gravity.	Degrees of salometer.
Goderich, sample taken August 19, 1866.....	259·000	0·432	0·254	1·882	1·205	100
Goderich, same well as above. November 5, 1868.....	236·410	0·190	0·410	4·858	1·187	92
Clinton well.....	204·070	0·470	0·184	5·583	1·157	80
Kincardine.....	241·350	0·840	0·230	3·264	1·191	94

<sup>1</sup> Analyses by Dr. T. Sterry Hunt, laboratory, Geological Survey of Canada.

## EXPORTS AND IMPORTS.

Comparatively small quantities only of salt are now exported from Canada, the exports in 1910 being 275,200 pounds, valued at \$2,618.

The imports of salt on the other hand are quite considerable. For the calendar year, 1910, the imports of salt, subject to duty, included salt in bulk, dutiable at 5 cents per 100 pounds, 14,430 tons, valued at \$47,761, and salt in bags, barrels or other packages, dutiable at 7½ cents per 100 pounds, 5,744 tons, valued at \$49,565. Salt imported from the United Kingdom or any British possession, or imported for the use of the sea or gulf fisheries, duty free, was imported to the extent of 108,794 tons, valued at \$364,735, giving total imports of 128,968 tons, valued at \$462,061.

Tables 3, 4 and 5, following, give the statistics of exports and imports of salt, since 1880.

SALT.—TABLE 3.

## Exports.

Calendar Year.	Bushels.	Value.	Calendar Year.	Bushels.	Value.
		\$			\$
1880.....	467,641	46,211	1896.....	3,842	899
1881.....	343,208	44,627	1897.....	5,383	1,193
1882.....	181,758	18,350	1898.....	5,202	1,252
1883.....	199,733	19,492	1899.....	11,205	2,773
1884.....	167,029	15,291	1900.....	37,653	8,997
1885.....	246,794	18,756	1901.....	39,224	6,510
1886.....	224,943	16,886	1902.....	9,331	3,798
1887.....	154,045	11,526		Lbs.	
1888.....	15,251	3,987	1903.....	1,915,648	5,927
1889.....	8,557	2,390	1904.....	1,006,036	4,186
1890.....	6,605	1,166	1905.....	1,447,728	6,112
1891.....	5,290	1,277	1906.....	618,707	3,437
1892.....	2,000	504	1907.....	2,222,542	7,709
1893.....	4,940	1,267	1908.....	529,229	3,840
1894.....	4,639	1,120	1909.....	276,765	2,488
1895.....	4,865	959	1910.....	275,200	2,618

## SALT.—TABLE 4.

## Imports:—Salt Paying Duty.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	726,640	3,916	1896.....	7,665,257	24,550
1881.....	2,588,465	6,355	1897.....	11,911,766	33,470
1882.....	3,679,415	12,318	1898.....	11,068,785	32,792
1883.....	12,136,968	36,223	1899.....	11,781,453	32,839
1884.....	12,770,950	38,949	1900.....	11,028,337	30,180
1885.....	10,397,761	31,726	1901.....	11,625,688	34,087
1886.....	12,266,021	39,181	1902.....	13,892,849	39,605
1887.....	10,413,258	35,670	1903.....	14,554,693	41,785
1888.....	10,509,799	32,136	1904.....	29,779,183	73,826
1889.....	11,190,088	38,968	1905.....	18,473,868	58,056
1890.....	15,135,109	57,549	1906.....	21,366,064	59,805
1891.....	15,140,227	59,311	1907..... (9 months)	21,834,435	58,553
1892.....	18,648,191	65,963	1908.....	31,019,400	79,341
1893.....	21,377,339	79,838	1909.....	31,653,900	83,660
1894.....	15,867,825	53,336	1910.....	35,230,000	83,043
1895.....	8,498,404	29,881			

	1909.		1910.	
	Lbs.	Value.	Lbs.	Value.
		\$		\$
Salt, fine, in bulk, N.E.S. (a).....	19,197,300	32,036	24,275,700	41,703
Salt, N.E.S., in bags, barrels or other packages (b)	12,456,600	51,624	10,954,300	41,340
Total.....	31,653,900	83,660	35,230,000	83,043

(a) Duty 5c per 100 lbs. (b) Duty 7½c per 100 lbs.

## SALT.—TABLE 5.

## Imports:—Salt not Paying Duty.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	212,714,747	400,167	1896.....	205,005,100	338,888
1881.....	231,640,610	488,278	1897.....	215,844,484	312,117
1882.....	166,183,962	311,489	1898.....	202,634,927	293,410
1883.....	246,747,113	386,144	1899.....	183,046,365	267,520
1884.....	225,390,121	321,243	1900.....	193,554,550	295,253
1885.....	171,571,209	255,719	1901.....	216,271,603	339,887
1886.....	180,205,949	255,359	1902.....	238,648,737	385,629
1887.....	203,042,332	285,455	1903.....	232,708,675	361,185
1888.....	184,166,986	220,975	1904.....	198,634,047	338,082
1889.....	180,847,800	253,009	1905.....	196,907,500	340,954
1890.....	158,490,075	252,291	1906.....	203,080,000	352,214
1891.....	195,491,410	321,239	1907†.....	139,459,900	240,841
1892.....	201,831,217	314,995	1908.....	200,944,800	350,878
1893.....	191,595,530	281,462	1909.....	232,237,700	376,961
1894.....	196,668,730	328,300	1910*.....	232,559,900	382,210
1895.....	201,691,248	332,711			

\* Salt imported from the United Kingdom, or any British possession, or imported for the use of the sea or gulf fisheries.

† Nine months only.



## Consumption of Salt in Canada in 1909 and 1910.

	1909.		1910.	
	Lbs.	Value.	Lbs.	Value.
		\$		\$
Canadian salt production.....	168,074,000	415,219	168,184,000	409,624
Less exports .....	276,765	2,488	275,200	2,618
	167,797,235	412,731	167,908,800	407,006
Imports of salt paying duty.....	31,653,900	83,660	35,230,000	83,043
" " free of duty.....	232,237,700	376,961	232,559,900	382,210
	431,688,835	873,352	435,698,700	872,259

All the salt imported from Great Britain enters Canada, free of duty under the British preferential tariff. From other countries only salt imported for the use of the sea or gulf fisheries enters free of duty.

Following is a list of firms engaged in the production of salt:—

Operator.	Address.
The Canadian Salt Co., Ltd.....	Windsor, Ont.
" " " (Sandwich Branch).....	" "
The Western Salt Co., Ltd.....	Mooretown, Ont.
Dominion Salt Co., Ltd.....	Sarnia, Ont.
The Elarton Salt Works, Co., Ltd.....	Hyde Park Corner, Ont.
Parkhill Salt Co.....	Parkhill, Ont.
Exeter Salt Works Co.....	Exeter, Ont.
Western Canada Flour Mills Co., Ltd.....	Goderich, Ont.
Stapleton Salt Works, c/o Jno. Ransford.....	Clinton, Ont.
Grey, Young & Sparling Co., of Ont., Ltd.....	Wingham, Ont.
Ontario People's Salt & Soda Co., Ltd.....	Kincardine, Ont.

## MISCELLANEOUS NON-METALLIC.

### ARSENIC.

While there was formerly a considerable production of white arsenic from the mispickel ores of Deloro, Ontario, operations on these ores ceased in 1903, and the principal source of arsenic production in Canada at the present time is furnished by the silver-cobalt-nickel-arsenic ores of the Cobalt district, together with a small annual production of arsenical concentrates from one of the gold mines in Nova Scotia.

Notwithstanding the fact that the mine owners of the Cobalt district receive practically nothing for the arsenical contents of their ores, white arsenic in addition to silver bullion, and nickel and cobalt oxides, is being recovered at three Canadian metallurgical works in which these ores are being treated. These plants are, one at Copper Cliff, operated by the Canadian Copper Company, a second at Thorold, Ont., operated by the Coniagas Reduction Company, and the third at Deloro, operated by the Deloro Mining and Reduction Company.

The quantity of these ores treated in 1910 was 9,466 tons, with a reported recovery of arsenic of 1,502 tons, valued at \$75,328.

In 1909, there were treated 8,384 tons of ore with a recovery of 1,129 tons of white arsenic.

The recovery in 1908 was 715½ tons white arsenic from 7,182 tons of ore treated; in 1907, 330 tons of white arsenic from 2,266 tons of ore treated, and in 1906, 201 tons of white arsenic from 998 tons of ore. This recovery is, of course, only a small portion of the total arsenical contents of the ores shipped, much of which is smelted outside of Canada.

During the past four years, arsenical concentrates have been shipped from the gold mine at Goldboro, Nova Scotia, now operated by the New England Mining Company. The arsenical concentrate is produced from the residue of the mill concentrates after the gold has been extracted by bromo-cyanide. The tailings, as discharged from the cyanide vats, carry about 40 per cent silica. These are concentrated to eliminate the silica, and brought down to a clean mispickel concentrate carrying from 38 per cent to 41 per cent metallic arsenic. It is dried and shipped in sacks, most of it going to Swansea and some to Belgium.

During 1909 there were shipped to Belgium 200 tons (of 2,240 pounds) which averaged 31.18 per cent arsenic. In 1910 the shipments were 547 tons, varying from 38 per cent to 40.7 per cent in arsenic.

In the following tables the production of arsenical ore and white arsenic and the imports and exports of arsenic are shown:—

## Annual Production of Arsenic.

Calendar Year.	ARSENICAL ORE.		WHITE ARSENIC.	
	Tons.	Value.	Tons.	Value.
		\$		\$
1885 .....			440	17,600
1886 .....			120	5,460
1887 .....			30	1,200
1888 .....			30	1,200
1889 .....			Nil.	Nil.
1890 .....			25	1,500
1891 .....			20	1,000
1892-3 .....			Nil.	Nil.
1894 .....			7	420
1895-8 .....			Nil.	Nil.
1899 .....			57	4,872
1900 .....			303	22,725
1901 .....			695	41,676
1902 .....			800	48,000
1903 .....			257	15,420
1904-5 .....				
1906 .....			201	14,058
1907 .....	656	11,094	330	36,209
1908 .....	986	17,506	715½	41,060
1909 .....	224	3,346	1,129	64,100
1910 .....	547	5,716	1,502	75,328

## Exports of White Arsenic.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1902 .....	547,698	16,192	1907 .....	613,504	10,850
1903 .....	395,573	10,583	1908 .....	1,913,732	43,493
1904 .....	146,000	6,900	1909 .....	3,111,249	119,673
1905 .....	108,000	5,400	1910 .....	4,512,673	173,932
1906 .....	271,063	5,981			

## Annual Imports of Arsenic, 1880-1906.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$			\$
1880 ....	18,197	576	1889 .....	69,269	2,434	1898 .....	291,967	14,270
1881 ....	31,417	1,070	1890 .....	138,509	4,474	1899 .....	582,383	24,293
1882 ....	138,920	3,962	1891 .....	115,248	4,027	1900 .....	230,730	11,035
1883 ....	51,953	1,812	1892 .....	302,958	9,365	1901 .....	159,263	8,361
1884 ....	19,337	773	1893 .....	447,079	12,907	1902 .....	106,857	6,004
1885 ....	49,080	1,566	1894 .....	292,505	10,018	1903 .....	298,375	11,824
1886 ....	30,181	961	1895 .....	1,115,697	31,932	1904 .....	414,065	12,421
1887 ....	32,436	1,116	1896 .....	664,854	27,523	1905 .....	268,274	7,661
1888 ....	27,510	1,016	1897 .....	152,275	8,378	1906 Duty free	446,975	19,169

## Imports of Arsenious Oxide and Sulphide of Arsenic.

Fiscal Year.	ARSENIUS OXIDE.		ARSENIC, SULPHIDE OF.		Total.
	Pounds.	Value.	Pounds.	Value.	
		\$		\$	\$
1907 (9 months).....	252,473	16,011	95,843	6,116	22,127
1908. ....	378,174	26,804	125,322	7,531	34,335
1009.....	128,612	4,064	389,815	14,575	18,639
1910.....	27,066	1,410	301,563	11,485	12,895
*1911.....	254,347	6,605	257,996	8,093	14,698

\* Provisional.

**CALCIUM CARBIDE.**

Three firms are engaged in the manufacture of this product in Canada,  
viz.:—

The Shawenegan Carbide Company, Shawenegan Falls, Que.

The Ottawa Carbide Company, Limited, Ottawa, Ont.

The Wilson Carbide Company, Limited, Merritton, Ont.

The production of calcium carbide in the province of Ontario has been ascertained by the Ontario Bureau of Mines for a number of years, and the record is as follows:—

**Calcium Carbide Production in Ontario.**

Calendar Year.	Tons.	Value.	Per ton.	Calendar Year.	Tons.	Value.	Per ton.
		\$	\$ cts.			\$	\$ cts.
1900.....	1,005	60,306	60 00	1906.....	2,626	162,780	61 98
1901.....	2,771	168,792	60 91	1907.....	2,667	173,763	65 15
1902.....	1,402	89,420	63 78	1908.....	2,364	147,150	62 25
1903.....	2,507	144,000	57 44	1909.....	2,349	151,676	64 57
1904.....	2,343	152,295	65 00	1910.....	3,072	184,323	60 00
1905.....	2,427	156,755	64 59				

## CHALK AND WHITING.

These materials are not produced in Canada, but statistics of their importation are given to show the market for them in Canada.

### Annual Imports of Chalk and Whiting, 1880-1910.

Fiscal Year.	CHALK (a)	WHITING (b)		Fiscal Year.	CHALK (a)	WHITING (b)	
	Value.	Cwt.	Value.		Value.	Cwt.	Value.
	\$		\$		\$		\$
1880.....	2,117	84,115	26,092	1896.....	6,467	113,791	27,322
1881.....	2,768	47,480	16,637	1897.....	7,432	102,453	22,541
1882.....	2,882	36,270	16,318	1898.....	9,338	166,293	25,761
1883.....	5,067	76,012	29,334	1899.....	10,461	134,884	34,310
1884.....	2,589	76,268	28,230	1900.....	12,212	127,455	34,575
1885.....	8,003	67,441	23,492	1901.....	11,629	209,868	60,878
1886.....	6,583	65,124	25,533	1902.....	11,337	153,982	42,136
1887.....	5,635	47,246	15,191	1903.....	16,497	139,804	39,867
1888.....	5,865	76,619	20,508	1904.....	19,163	186,919	42,507
1889.....	5,336	84,658	22,735	1905.....	20,896	198,485	51,215
1890.....	7,221	96,243	27,471	1906.....	23,853	160,030	44,876
1891.....	8,193	84,679	27,504	1907.....	17,446	128,018	33,453
1892.....	9,558	102,985	26,867	1908.....	24,122	228,699	63,499
1893.....	9,966	88,835	25,563	1909.....	24,066	150,484	45,314
1894.....	11,308	103,633	26,649	1910.....	29,566	206,641	76,404
1895.....	7,730	102,751	25,441				

(a) Chalk prepared. Duty 20 per cent. (b) Whiting or whitening, gilders whiting, and Paris white. Duty free.

## FLUORSPAR.

The occurrence of fluorspar has been noted on lot 1, concession IV, of Madoc township, Hastings county, Ontario, and some very fine crystals have been obtained from this deposit. In 1905 the deposit was opened by S. Wellington of Madoc, and a shipment of 12 tons made to Port Hope. In 1910 there were mined 200 tons, of which two tons, valued at \$15, were shipped to the metallurgical works at Deloro.

Imports of fluorspar are not separately shown in the report of the Customs Department, but considerable quantities are used in steel furnaces, the quantity thus consumed in 1910 being reported as 7,461 tons.

## MAGNESITE.

The occurrence of magnesite in the township of Grenville, Argenteuil county, was recognized about eight years ago. A couple of tons were shipped in 1904 for experimental tests, by Mr. M. B. McAllister of Ottawa, and numerous samples were collected and analysed in the laboratory of the Geological Survey, a complete report on which will be found in the Annual Report of the Geological Survey, Vol. XIII, Part R. In 1907, Mr. T. J. Watters, of Ottawa, acquired the north half of lot 18, range XI., of Grenville, and undertook some prospecting and development. About 120 tons, valued at \$7 per ton, were shipped in 1908, finding a market in Montreal, Pittsburg and New York. The



property has been taken over by the Canadian Magnesite Company of Montreal, and the latter company shipped 330 tons, valued at \$2,508 during 1909, and 323 tons, valued at \$2,160, in 1910.

## QUARTZ.

Considerable quantities of quartz are used by the smelters of nickel-copper ores. It is also used in the manufacture of ferro-silicon, and ground quartz is used by the manufacturers of sanitary ware and enamelled ware.

The production in 1910, was reported as 88,205 tons, valued at \$91,951, as compared with 56,924 tons, valued at \$71,285, in 1909. Statistics of the annual production of quartz, so far as these have been obtained, are shown in the next table.

### Annual Production of Quartz.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1890 .....	200	1,000	1900-1905 .....		
1891-2 .....			1906 .....	48,376	65,765
1893 .....	100	500	1907 .....	56,585	124,148
1894-5-6 .....	10	50	1908 .....	44,741	52,830
1897 .....			1909 .....	56,924	71,285
1898 .....	284	570	1910 .....	88,205	91,951
1899 .....	600	1,260			

### Imports of Sillex:—Crystallized Quartz.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$
1880 .....	5,252	2,290	1896 .....	3,289	2,174
1881 .....	3,251	1,659	1897 .....	2,564	3,415
1882 .....	3,283	1,678	1898 .....	3,104	2,773
1883 .....	3,543	2,058	1899 .....	3,951	2,595
1884 .....	3,259	1,709	1900 .....	4,021	2,876
1885 .....	3,527	1,443	1901 .....	3,562	2,106
1886 .....	2,520	1,313	1902 .....	4,388	3,858
1887 .....	14,533	5,073	1903 .....	3,514	2,762
1888 .....	4,808	2,385	1904 .....	5,547	4,409
1889 .....	5,130	1,211	1905 .....	8,931	4,475
1890 .....	1,768	2,617	1906 .....	7,465	8,347
1891 .....	3,674	1,929	1907 (9 mos.) .....	11,964	12,969
1892 .....	1,429	1,244	1908 .....	24,938	19,166
1893 .....	2,447	1,301	1909 .....	6,206	6,909
1894 .....	2,451	1,521	1910 Duty free .....	11,460	9,531
1895 .....	2,882	1,881			

## TALC.

The production of talc has increased very rapidly during the past two years, the shipments from the mine in 1910, being reported as 7,112 tons, valued at \$22,308, as compared with 4,350 tons, valued at \$10,300, in 1909.

The production in recent years has all been derived from the Henderson talc mine in the township of Madoc, county of Hastings. Formerly the output was exported to United States points, and used chiefly in the manufacture of cosmetics. Recently, however, a mill has been erected at Madoc for grinding the crude talc and preparing it for the trade. Most of the finished material is now sold in Canada, a large part being used in the paper trade.

### Annual Production of Soapstone and Talc.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886 .....	50	400	1899 .....	450	1,960
1887 .....	100	800	1900 .....	1,420	6,365
1888 .....	140	280	1901 .....	259	842
1889 .....	195	1,170	1902 .....	689	1,804
1890 .....	917	1,239	1903 .....	990	2,739
1891 .....	Nil	Nil	1904 .....	840	1,875
1892 .....	1,374	6,240	1905 .....	500	1,800
1893 .....	717	1,920	1906 .....	1,234	3,030
1894 .....	916	1,640	1907 .....	1,534	4,602
1895 .....	475	2,138	1908 .....	1,616	3,048
1896 .....	410	1,230	1909 .....	4,350	10,300
1897 .....	157	350	1910 .....	7,112	22,308
1898 .....	405	1,000			

## STRUCTURAL MATERIALS AND CLAY PRODUCTS.

The subjects included under this heading comprise, in the order treated: cement; clay products of various kinds, such as brick, sewerpipe and tile, pottery, etc.; lime; sand-lime brick; sands and gravels; slate; and stone for building and other purposes, including granite, marble, limestone, sandstone, etc.

The rapid growth of Canada's population, particularly in the west, and the development of industrial resources throughout the country are naturally accompanied by a greatly increased production of clay products and other structural material such as those enumerated above.

The record shows a total production of these products in 1910 valued at \$19,627,592, as compared with a value of \$16,533,349 in 1909; an increase of \$3,094,243 or 18.72 per cent.

Statistics of building permits issued in twenty-four cities representative of every province of the Dominion show a corresponding growth. The total permits for construction issued in 1910 were \$94,129,423, compared with permits of \$64,509,620 in 1909; an increase of 45.92 per cent.

A summary of the production of structural materials and clay products is shown below:—

	1906.	1907.	1908.	1909.	1910.
	\$	\$	\$	\$	\$
Cement.....	3,170,859	3,781,371	3,709,954	5,345,802	6,412,215
Clay products.....	5,072,635	5,772,117	4,500,702	6,450,840	7,629,956
Lime.....	1,009,177	974,595	712,947	1,132,756	1,137,079
Sand-lime brick.....		167,795	152,856	201,650	371,857
Sand and gravels (exports).....	139,712	119,853	161,387	256,166	407,974
Slate.....	24,446	20,056	13,496	19,000	18,492
Stone.....	2,113,699	2,027,262	2,088,613	3,127,135	3,650,019
Total.....	11,530,528	12,863,049	11,339,955	16,533,349	19,627,592

The increase in the value of cement sales in 1910 over 1909 was 20 per cent; clay products, an increase of 18 per cent; stone, an increase of 17 per cent; sand-lime brick, an increase of 84 per cent. There was only a small increase in the production of lime and about the same production of slate. Complete statistics of sand and gravel production are not yet collected, the figures given showing only the amounts of these products exported.

In addition to the domestic production of these structural materials there is also a considerable importation into Canada, particularly of the clay products. The imports during 1910 include cement to the value of \$468,046; clay products, \$4,331,397; lime, \$138,847; sand and gravel, \$196,766; slate, \$142,285; stone, \$845,123; or a total import valued at \$6,122,464.

## CEMENT.

While the production of cement in Canada in 1910 is all classed as Portland, the output includes Puzzolan cement made at Sydney, N.S., and a "natural Portland" made at Babcock, Manitoba, located 75 miles southwest of Winnipeg on the Canadian Northern railway.

According to returns received from the manufacturers, the total quantity of cement made in Canada during 1910 was 4,396,282 barrels of 350 pounds net, as compared with 4,146,708 barrels in 1909; an increase of 249,574 barrels or 6 per cent.

The total quantity of Canadian Portland cement sold in 1910 was 4,753,975 barrels, as compared with 4,067,709 barrels in 1909; or an increase of 686,266 barrels or 16.9 per cent.

The total consumption of Portland cement in 1910, including Canadian and imported cements, was 5,103,285 barrels (of 350 pounds net), as compared with 4,209,903 barrels in 1909; or an increase of 893,382 barrels, or 21.2 per cent.

Statistics of the total annual sales of natural rock and Portland cement since 1887 are shown in the following table:—

**Annual Production of Cement.\***

Calendar Year.	Natural Rock Cement.		Portland Cement.		Totals.	
	Barrels.	Value.	Barrels.	Value.	Barrels.	Value.
		\$		\$		\$
1887.....					69,843	81,909
1888.....					50,668	35,593
1889.....	90,474	69,790	Nil.	Nil.	90,474	69,790
1890.....	87,521	74,822	14,695	17,583	102,216	92,405
1891.....	90,846	103,479	2,633	5,082	93,479	108,561
1892.....	88,187	94,912	29,221	52,751	117,408	147,663
1893.....	126,673	130,167	31,924	63,848	158,597	194,015
1894.....	72,965	74,842	35,177	69,795	108,142	144,637
1895.....	66,219	60,795	62,075	112,880	128,294	173,675
1896.....	70,705	60,500	78,385	141,151	149,090	201,651
1897.....	85,450	65,893	119,763	209,380	205,213	275,273
1898.....	87,125	73,412	163,084	324,168	250,209	397,580
1899.....	147,387	119,308	255,366	513,983	396,753	633,291
1900.....	125,428	99,994	292,124	562,916	417,552	662,910
1901.....	133,328	94,415	317,066	565,615	450,394	660,030
1902.....	127,931	98,932	594,594	1,028,618	722,525	1,127,550
1903.....	92,252	74,655	627,741	1,150,592	719,993	1,225,247
1904.....	56,814	50,247	910,358	1,287,992	967,172	1,338,239
1905.....	14,184	10,274	1,346,548	1,913,740	1,360,732	1,924,014
1906.....	8,610	6,052	2,119,764	3,164,807	2,128,374	3,170,859
1907.....	5,775	4,043	2,436,903	3,777,328	2,441,868	3,781,371
1908.....	1,044	815	2,665,289	3,709,139	2,666,333	3,709,954
1909.....	0	0	4,067,709	5,345,802	4,067,709	5,345,802
1910.....	0	0	4,753,975	6,412,215	4,753,975	6,412,215

\*Quantities sold or shipped.

The production of cement in 1910 was derived from 22 operating plants with a total daily capacity of 25,835 barrels, the operating plants being distributed as follows: one in Nova Scotia using blast furnace slag; one in Manitoba making a natural Portland cement; one in British Columbia; two in Alberta and three in Quebec using limestone and clay; and fourteen in Ontario of which eleven used marl and three limestone. The Exshaw plant was not operated during the year nor was the Point Ann plant of the Canada Cement Company, in Ontario.

A comparison of the principal cement statistics for 1909 and 1910, giving the increases or decreases, as the case may be, is shown in the next table.

### Comparison of Production, Sales, and Imports of Portland Cement in 1909 and 1910.

—		1909.	1910.	Increase.	%	Decrease.	%
Cement sold.....	Bls.	4,067,709	4,753,975	686,266	16.9		
Cement manufactured.....	"	4,146,708	4,396,282	249,574	6.0		
Stock on hand Jan. 1.....	"	1,098,239	1,189,731	91,492	8.3		
Stock on hand Dec. 31.....	"	1,177,238	832,038			345,200	29.3
Value of cement sold.....	\$	5,345,802	6,412,215	1,066,413	20.0		
Average price per barrel.....	"	1.31	1.35	0.04	3.1		
Wages paid.....	"	1,266,128	1,409,715	143,587	11.3		
Men employed.....	No.	2,498	2,220			278	11.1
Imports of Portland cement... Bls.		142,194	349,310	207,116	146.0		
Value of cement.....	\$	166,669	468,046	301,377	181.0		
Average price per barrel.....	"	1.17	1.34	0.17	14.5		
Total consumption of cement in Canada..... Bls.		4,209,903	5,103,285	893,382	21.2		
No. of completed plants operated....		21	22	1	4.8		
Total daily capacity of operating plants as on Dec. 31..... Bls.		23,050	25,835	2,785	12.1		

It will be observed that there was a falling off in the stock of cement on hand at the end of 1910 as compared with the stock at the end of 1909, also that there was a considerable increase in the imports of cement. The total wages paid show an increase of about 11 per cent although apparently there was at the same time a decrease in the average number of men employed; an increase of 6 per cent only is shown in the quantity of cement made, as compared with an increase of 17 per cent in the sales and an increase of 21 per cent in the consumption. Of the total quantity of cement made in 1910, 1,214,479 barrels were made from marl and 3,181,803 barrels from limestone and slag. In 1909 there were 810,706



barrels made from marl and 3,336,002 barrels made from limestone and slag, and in 1908, 1,573,090 barrels were made from marl and 1,922,871 barrels from limestone and slag.

The detailed production of cement in Ontario during 1909 and 1910 is shown in the next table and the production in all other provinces in the table following:—

### Cement Production in Ontario, 1909 and 1910.

—	1909.	1910.	Increase.	%	Decrease.	%
Cement sold..... Bls.	2,462,027	2,504,650	42,623	1.7		
Cement manufactured..... "	2,283,263	2,496,200	212,937	9.3		
Stock on hand Jan. 1..... "	765,873	600,971			164,902	21.5
Stock on hand Dec. 31..... "	587,109	592,521	5,412	0.9		
Value of cement sold..... \$	3,084,218	3,150,479	66,261	2.2		
Wages paid..... "	606,639	743,213	136,574	22.5		
Men employed..... No.	1,340	1,306			34	2.5
Total daily capacity of operating plants..... Bls.	12,450	15,300	2,850	22.9		

### Cement Production in other Provinces, 1909 and 1910.

—	1909.	1910.	Increase.	%	Decrease.	%
Cement sold..... Bls.	1,605,682	2,249,325	643,643	40.1		
Cement manufactured..... "	1,863,445	1,900,082	36,637	2.0		
Stock on hand Jan. 1..... "	332,366	588,760	256,394	77.1		
Stock on hand Dec. 31..... "	590,129	239,517			350,612	59.4
Value of cement sold..... \$	2,261,584	3,261,736	1,000,152	44.2		
Wages paid..... "	659,489	666,502	7,013	1.1		
Men employed..... No.	1,153	914			244	21.1
Total daily capacity of operating plants..... Bls.	10,000	10,535	535	5.4		

Statistics of the annual production of Portland cement for a number of years showing the quantity made, the quantity sold, stocks on hand at the end of the year, value of sales, etc., are shown in the next table.

### Annual Production of Portland Cement.

Year.	Quantity Made.	Quantity Sold.	On hand Dec. 31.	Value of Sales.	Average per barrel.	Daily Capacity.
	Barrels.	Barrels.	Barrels.	\$	\$ cts.	Barrels.
1897.....		119,763		209,380	1 75	
1898.....		163,084		324,168	1 99	
1899.....		255,366		513,983	2 01	
1900.....		292,124		562,916	1 91	
1901.....	360,160	317,066	58,094	565,615	1 78	
1902.....	562,335	594,594	33,446	1,028,618	1 73	3,900
1903.....	714,136	627,741	128,386	1,150,592	1 83	4,850
1904.....	908,990	910,358	112,051	1,287,992	1 41	
1905.....	1,541,568	1,346,548	306,466	1,913,740	1 42	8,000
1906.....	2,152,562	2,119,764	302,356	3,164,807	1 49	10,500
1907.....	2,491,513	2,436,093	354,435	3,777,328	1 55	14,400
1908.....	3,495,961	2,665,289	1,214,021	3,709,139	1 39	27,500
1909.....	4,146,708	4,067,709	1,777,238	5,345,802	1 31	23,050
1910.....	4,396,282	4,753,975	832,038	6,412,215	1 35	25,835

*Imports and Exports.*—There has been very little cement exported from Canada during past years. The value of the exports during 1910 was only \$12,914, as compared with a value in 1909 of \$113,362 and in 1908 of \$34,591. The quantity exported is not shown in the Customs reports.

The imports, which, previous to 1901, were larger than the Canadian production, have been decreasing since 1906, although in 1910 a considerable increase in imports is again shown. The imports in 1910 were 349,310 barrels or about 7 per cent of the total consumption, as compared with imports of 142,194 barrels in 1909 or about 3 per cent of the consumption in that year. A duty of 12½ cents per 100 pounds, equivalent to 42½ cents per barrel of 350 pounds net, is levied on imports. The weight of the package is, however, included for purposes of duty.

The United States was the principal source of imports of cement during 1910, supplying about 48 per cent of the whole. Great Britain supplied about 35 per cent of the imports in 1910, as compared with 64 per cent in 1909.

The imports of cement during 1909 and 1910 by countries were as follows:—

## Imports of Cement.

	1909.			1910.		
	Cwt.	%	Value.	Cwt.	%	Value.
			\$			\$
Great Britain.....	322,149	64.7	104,060	433,578	35.5	130,951
United States.....	145,962	29.3	51,222	591,403	48.4	253,463
Belgium.....	15,761	3.2	5,029	66,595	5.4	20,618
Other countries.....	13,806	2.8	6,358	131,010	10.7	63,014
Totals.....	497,678	100.0	166,669	1,222,586	100.0	468,046
Equivalent in barrels.....	142,194			349,310		

Statistics of the exports of cement since 1891 and of the imports since 1880 are given in the next two tables:—

## Exports of Cement.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1891.....	2,881	1898.....	2,117	1905.....	3,143
1892.....	938	1899.....	2,733	1906.....	7,551
1893.....	1,172	1900.....	3,296	1907.....	9,618
1894.....	482	1901.....	1,514	1908.....	34,591
1895.....	937	1902.....	2,267	1909.....	113,362
1896.....	1,328	1903.....	2,851	1910.....	12,914
1897.....	644	1904.....	5,494		

## Imports of Cement into Canada.

Fiscal Year.	Cement and Mfrs. of, N.E.S.*	Hydraulic Cement.		Portland Cement.	
		Barrels.	Value.	Barrels.	Value.
	\$		\$		\$
1880.....	28	10,034	10,306	.....	55,774
1881.....	298	7,812	7,821	.....	45,646
1882.....	86	11,945	13,410	.....	66,579
1883.....	548	11,659	13,755	.....	102,537
1884.....	1,236	8,606	9,514	.....	102,857
1885.....	1,315	5,613	5,396	.....	111,521
1886.....	1,851	6,164	6,028	.....	120,398
1887.....	1,419	6,160	8,784	102,750	148,054
1888.....	5,787	5,636	7,522	122,402	177,158
1889.....	10,668	5,835	7,467	122,273	179,406
1890.....	5,443	5,440	9,048	192,322	313,572
1891.....	2,890	3,515	6,152	183,728	304,648
1892.....	3,394	2,214	2,782	187,233	281,553
1893.....	2,909	4,896	8,060	229,492	316,179
1894.....	2,618	1,054	985	224,150	280,841
1895.....	2,112	5,333	7,001	196,281	242,813
1896.....	3,672	5,688	8,948	204,407	242,409
1897.....	4,318	2,494	3,937	210,871	252,587
		Cwt.		Cwt.	
1898.....	3,263	16,033	7,097	1,073,058	355,264
1899.....	8,929	1,678	694	1,800,424	467,994
1900.....	10,452	10,418	4,711	1,301,361	498,607
1901.....	4,890	17,784	6,865	1,612,432	654,595
1902.....	12,234	29,585	17,755	1,971,616	833,657
1903.....	16,281	13,690	6,333	2,316,853	868,131
1904.....	14,305	12,088	5,391	2,476,388	995,017
1905.....	18,489	16,961	10,690	4,228,394	1,234,649
1906.....	27,858	10,794	4,034	2,848,582	963,839
1907 (9 mos.).....	16,201	1,192	685	1,551,493	523,120
1908.....	12,418	18,860	6,710	2,427,381	852,041
1909.....	5,733	438	466	1,460,850	475,676
1910.....	7,678	588	553	490,809	158,487

\* Cement not elsewhere specified and manufactures of cement.

*Consumption of Cement.*—Although the exports of cement have been increasing during the past two years, the value is still comparatively small, and as the quantity has not been recorded, the consumption has been estimated on the basis of the Canadian production and the imports.

The total consumption of Portland cement in Canada in 1910 was 5,103,285 barrels (893,075 tons), made up of: 4,753,975 barrels (831,946 tons) of Canadian cement, or 93 per cent; and 349,310 barrels (61,129 tons) of imported cement, or 7 per cent.

In 1909 the total consumption was 4,209,903 barrels (736,733 tons), of which 97 per cent was made in Canada, and 3 per cent imported.

In 1901 the total consumption was 872,966 barrels (152,769 tons), of which only 36 per cent was made in Canada, and 64 per cent was imported.

Following is an estimate of the consumption of Portland cement in Canada during the past ten years:—

### Annual Consumption of Portland Cement.

Calendar Year.	Canadian.		Imported.		Total.
	Barrels.	%	Barrels.	%	Barrels.
1901.....	317,066	36	555,900	64	872,966
1902.....	594,594	52	544,954	48	1,139,548
1903.....	627,741	45	773,678	55	1,401,419
1904.....	910,358	54	784,630	46	1,694,988
1905.....	1,346,548	59	918,701	41	2,265,249
1906.....	2,119,764	76	665,845	24	2,785,609
1907.....	2,436,093	78	672,630	22	3,108,723
1908.....	2,665,289	85	469,049	15	3,134,338
1909.....	4,067,709	97	142,194	3	4,209,903
1910.....	4,753,975	93	349,310	7	5,103,285

Following is a list of cement manufacturing companies:—

Name.	Location of Plant	Head Office.
Sydney Cement Company, Ltd.....	Sydney, N.S.....	Sydney, N.S
Canada Cement Company, Ltd.....		Montreal, Que.
Montreal Mill No. 1.....	Longue Point, Que.....	
Montreal Mill No. 2.....	Kilbourn Siding, Que.....	
International Mill.....	Hull, Que.....	
Owen Sound Mill.....	Shallow Lake, Ont.....	
Belleville Mill.....	Belleville, Ont.....	
Lehigh Mill.....	Belleville, Ont.....	
Lakefield Mill.....	Lakefield, Ont.....	
Marlbank Mill.....	Marlbank, Ont.....	
Port Colborne Mill.....	Port Colborne, Ont.....	
Alberta Mill.....	Calgary, Alta.....	
Grey and Bruce Portland Cement Co.,.....	Owen Sound, Ont.....	Owen Sound, Ont.
The Sun Portland Cement Co., Ltd.....	Owen Sound, Ont.....	Owen Sound, Ont.
The Imperial Cement Co., Ltd.....	Owen Sound, Ont.....	Owen Sound, Ont.
Hanover Portland Cement Co., Ltd.....	Hanover, Ont.....	Hanover, Ont.
The Ontario Portland Cement Co., Ltd.....	Blue Lake, Ont.....	Brantford, Ont.
The National Portland Cement Co., Ltd.....	Durham, Ont.....	Durham, Ont.
Kirkfield Portland Cement Co., Ltd.....	Raven lake, Ont.....	Toronto, Ont.
Superior Portland Cement Co., Ltd.....	Orangeville, Ont.....	Orangeville, Ont.
The Maple Leaf Portland Cement Co., Ltd.....	Atwood, Ont.....	Listowel, Ont.
The Crown Portland Cement Co., Ltd.....		Warton, Ont.
The Commercial Cement Co., Ltd.....	Babcock, Man.....	Winnipeg, Man.
The Western Canada Cement & Coal Co.....	Exshaw, Alta.....	Ottawa, Ont.
The Rocky Mountain Cement Co.....	Blairmore, Alta.....	Blairmore, Alta.
Vancouver Portland Cement Co.....	Tod inlet, B.C.....	Victoria, B.C.



Following is a list of companies building, or contemplating the erection of mills:—

Ben Allan Portland Cement Co.....	.....	Owen Sound, Ont.
Lake Medal Portland Cement Co.....	.....	Hamilton, Ont.
Bells Lake Portland Cement Co. ....	.....	Markdale, Ont.
The Brant Portland Cement Co.....	.....	Brantford, Ont.
Canada Cement Co., (Quebec Mill).....	Neuville, Que.....	Montreal, Que.
British Columbia Portland Cement Co....	.....	Princeton, B.C.

## CLAY PRODUCTS.

The clay products made in Canada comprise brick of various kinds, including common and pressed brick, paving, ornamental, and fancy brick, firebrick, porous fireproofing brick and blocks, sewerpipe, drain tile, pottery, and sanitary ware.

According to the returns received the total production of clay products in 1910 was valued at \$7,629,956, as compared with a value of \$6,450,840 in 1909; showing an increase of \$1,179,116, or 18.3 per cent.

The total value of the production in 1908 was \$4,500,702 and in 1907, \$5,772,117.

These statistics represent actual sales; material produced but held in stock over the end of the year not being included until disposed of. The annual record is now fairly complete although there are still a number of small producers who neglect to send in their returns. For the year 1910 about 438 active firms reported sales of clay products; the average number of men employed was 8,656 and total wages paid, \$3,308,609. Of the total clay products production in 1910 about 78.5 per cent was made up of building and paving brick and about 15 per cent of sewerpipe and tile.

### Production of Clay Products, 1909 and 1910.

		1909.			1910.		
		Quantity.	Value.	Per M.	Quantity.	Value.	Per M.
			\$	\$ cts.		\$	\$ cts.
Bricks—							
Common.....	No.	539,228,708	4,212,424	7 81	627,715,319	5,105,354	8 13
Pressed.....	"	57,264,656	630,677	11 01	67,895,034	807,294	11 89
Paving.....	"	3,759,803	67,408	17 93	4,214,917	78,980	18 74
Ornamental.....			8,866		703,345	16,092	22 89
Firebrick and fireclay shapes, etc.....			78,132			50,215	
Fireproofing, and architectural terra-cotta, etc.....			113,886			176,979	
Pottery.....			285,285			250,924	
Sewerpipe.....			645,722			774,110	
Tiles, drain.....		27,571,097	408,440	14 81	24,562,648	370,008	
Totals.....			6,450,840			7,629,956	

### Production of Clay Products, 1907 and 1908.

	1907.			1908.		
	Quantity.	Value.	Per M.	Quantity.	Value.	Per M.
		\$	\$ cts.		\$	\$ cts.
Bricks—						
Common.....No.	439,015,556	3,455,524	7 87	353,261,268	2,611,554	7 39
Pressed....."	78,922,092	794,722	10 07	53,480,764	517,180	9 67
Paving....."	3,617,720	72,354	20 00	3,719,961	59,456	15 98
Ornamental.....		47,288			18,535	
Firebrick and fireclay shapes, etc.....		131,322			110,302	
Fireproofing, and architectural terra-cotta, etc.....		89,389			170,211	
Pottery.....		253,809			200,541	
Sewerpipe.....		667,100			514,362	
Tiles, drain.....		260,609		20,100,261	298,561	14 85
Totals.....		5,772,117			4,500,702	

By provinces, the production during the past five years has been as follows:—

### Production of Clay Products by Provinces, 1906-1910.

Province.	1906.	1907.	1908.	1909.	1910.
	\$	\$	\$	\$	\$
Nova Scotia.....	160,506	125,560	117,833	188,185	204,782
New Brunswick.....	49,220	57,377	75,513	65,570	56,475
Quebec.....	769,458	1,214,108	893,717	1,153,832	1,442,842
Ontario.....	3,136,870	3,123,372	2,476,152	3,425,841	3,667,810
Manitoba.....	517,065	466,432	265,091	559,008	781,605
Saskatchewan.....	136,022	125,459	87,566	145,516	160,850
Alberta.....	180,217	353,672	240,384	442,486	753,232
British Columbia.....	123,277	306,137	344,446	470,402	562,360
	5,072,635	5,772,117	4,500,702	6,450,840	7,629,956

### Annual Value of Production of Clay Products, 1899-1910.

Calendar. Year.	Value.	Calendar. Year.	Value.	Calendar. Year.	Value.
	\$		\$		\$
1899.....	2,988,099	1903.....	4,034,289	1907.....	5,772,117
1900.....	3,195,105	1904.....	3,841,560	1908.....	4,500,702
1901.....	3,382,706	1905.....	4,709,842	1909.....	6,450,840
1902.....	3,625,489	1906.....	5,072,635	1910.....	7,629,956

*Exports and Imports.*—The only export of clay products recorded is that of building brick, of which the exports in 1910 were 390,000 valued at \$2,762, as compared with 365,000 in 1909 valued at \$2,255, and 2,344,000 in 1908 valued at \$9,047. The imports of clay and clay products into Canada are, on the other hand, quite considerable and amounted in value during the calendar year 1910 to \$4,331,397, equivalent to about 56 per cent of the domestic production. In 1909 the imports were valued at \$3,247,539, showing an increase in 1910 of \$1,083,858 or 33.4 per cent. These imports include chiefly manufactured products, such as brick, tile, earthenware, and china of all kinds. There is also, however, quite a large importation of clays, such as the better grades of china-clay, fireclay, etc. The imports of brick and tile were valued at \$1,755,773, as compared with \$1,249,450 in 1909. Earthenware and china were imported to a value of \$2,283,116, as compared with \$1,781,759 in 1909, and clays to a value of \$292,508 in 1910, as compared with \$216,330 in 1909.

### Imports of Clay Products, 1909 and 1910.

Imports.	12 months ending March, 1909.	12 months ending December, 1909.	12 months ending December, 1910.
	\$	\$	\$
<b>Brick and tiles—</b>			
Bathbrick.....	4,432	1,495	2,290
Building brick.....	108,773	195,360	274,482
Paving brick.....	101,187	139,366	124,994
Firebrick of a kind not made in Canada.....	350,457	485,994	811,927
Drain tile, not glazed.....	2,394	2,785	4,485
Drain pipe, sewerpipe, etc.....	106,399	170,280	175,599
Mfgs. of clay, N.O.P.....	141,391	254,170	361,996
	815,033	1,249,450	1,755,773
<b>Earthenware and chinaware—</b>			
Brown coloured.....	28,273	36,673	53,413
Demijohns, churns, and crocks.....	10,571	8,888	6,607
Tableware of china, porcelain, white granite.....	1,202,537	1,212,365	1,545,538
China and porcelain.....	87,798	87,467	95,509
Tiles or blocks of.....	43,299	56,974	90,524
Earthenware tiles, N.O.P.....	79,854	81,393	125,772
Mfgs. of earthenware, N.O.P.....	66,932	78,063	163,278
Earthenware, N.O.P.....	197,623	219,936	202,475
	1,716,887	1,781,759	2,283,116
<b>Clays—</b>			
China-clay.....	90,922	100,066	142,125
Fireclay.....	77,146	86,161	124,293
Pipeclay.....	887	310	114
Clays, all other, N.O.P.....	21,280	29,793	25,976
	190,235	216,330	292,508
<b>Grand total.....</b>	<b>2,722,155</b>	<b>3,247,539</b>	<b>4,331,397</b>

In addition to the imports shown in the above table, there is also a considerable annual importation of "chalk, china or cornwall stone, cliff stone and feldspar, fluorspar, magnesite ground or unground," much of which is no doubt used in connexion with the manufacture of clay products. The value of these

imports during the calendar year 1910 was \$121,959: of which \$90,131 was from the United States and \$29,646 from Great Britain. The value of the imports under this item during the calendar year 1909 was \$96,747. There is also an annual importation of "baths, bath tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material," the value of such imports during 1910 being \$262,667, as compared with \$211,837 during the year 1909.

Imported clay products are derived chiefly from Great Britain and the United States, although considerable quantities of earthenware, china and porcelain ware, white granite or ironstoneware, etc., are brought from Germany, France, Austria-Hungary, and Japan. The imports during the fiscal year, showing the country of origin, are shown in the next table. Of the brick and tile imported 74.4 per cent was from the United States and 25.5 per cent from Great Britain; and only \$607 worth from other countries. Of the earthenware and chinaware 63 per cent was imported from Great Britain; 14 per cent from the United States; 8 per cent from Germany; 6 per cent from France, and considerable values also from Japan, Austria-Hungary, and other countries. The crude clays were imported principally from Great Britain and the United States.

## Imports of Clay Products during the twelve months ending March, 1910, showing Countries of Origin.

Imports.	Great Britain.	United States.	Germany.	France.	Austria-Hungary.	Japan.	Other Countries.	Total.
	\$	\$	\$	\$	\$	\$	\$	\$
Brick and tile:—	1,361	197,017						1,361
Bath brick.....	21,158	73,706						218,175
Building brick.....	65,057	448,632		117				138,763
Paving brick.....	70,705	2,052		174				519,454
Firebrick, of a class or kind not made in Canada.	513							2,739
Drain tile, not glazed.....								
Drain pipe, sewerpipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed.	46,228	149,534	69			7	240	196,002
Manufactures of clay, N.O.P.....	137,321	127,419						294,816
Total.....	342,343	998,360	69	291		7	240	1,341,310
Earthenware and chinaware:—								
Brown or coloured earthenware and stoneware, and Rockingham ware.....	7,840	30,769	276	96	10		44	39,035
C. C. or cream coloured ware, decorated, printed or sponged, and all earthenware, N.O.P.....	141,745	53,693	10,179	3,910	1,542	12,436	2,384	225,889
Demijohns, churns or crocks.....	485	7,021	7					7,513
Tableware of china, porcelain, white granite or ironstoneware.....	919,430	25,139	135,345	92,346	48,057	39,733	8,929	1,268,979
China and porcelain ware, N.O.P.....	30,580	11,222	14,145	8,368	5,574	22,332	1,538	98,759
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....	14,100	47,566		2,404		7	1,082	65,159
Earthenware tiles, N.O.P.....	43,415	39,160		1,405			903	84,883
Manufacture of earthenware, N.O.P.....	13,173	54,590	1,816	1,469	478	2,364	195	74,085
Total.....	1,170,768	269,160	161,768	109,998	55,661	76,872	15,075	1,859,302



## Imports of Clay Products during the twelve months ending March, 1910, showing Countries of Origin.—Continued.

Imports.	Great Britain.	United States.	Germany.	France.	Austria-Hungary.	Japan.	Other Countries.	Total.
	\$	\$	\$	\$	\$	\$	\$	\$
Clays:—								
China-clay, ground or unground.....	76,672	23,433					902	101,007
Fireclay, ground or unground.....	20,535	65,155					200	86,151
Pipeclay, ground or unground.....	151	52	173	88				203
Clays, all other, N.O.P.....	2,958	27,873					40	30,871
Total.....	100,316	116,513	173	88			1,142	218,232
Grand total.....	1,613,427	1,384,033	166,010	110,377	55,661	76,879	16,457	3,418,844
Per cent of total.....	47.19	40.48	4.74	3.23	1.63	2.25	0.48	100.00
Baths, bath-tubs, basins, closets, lavatories, urinals, sinks and laundry tubs of any material.	31,611	198,567	65	10			4	230,257
Chalk, china or cornwall stone, cliff stone and feld- spar, fluorspar, magnesite, ground or unground.	16,842	92,418	126	170	201		952	110,709

A record of the total annual value of the imports of clay products since 1900 is shown in the next table. In eleven years Canada has imported clay products to the value of \$25,500,738. The increase in imports has been most pronounced in the case of brick and tile, the imports of which in 1900 amounted to \$145,914, as compared with \$1,341,310 in 1910. The imports of earthenware and china-ware, and of clays have nearly doubled in the same time.

### Imports of Clay Products (total value) 1900-10.

Fiscal Year.	Brick and Tile.	Earthenware and Chinaware.	Clays.	Total.
	\$	\$	\$	\$
1900.....	145,914	959,526	122,965	1,228,405
1901.....	133,343	1,114,677	141,251	1,389,271
1902.....	172,281	1,275,093	140,521	1,587,895
1903.....	157,783	1,406,610	176,416	1,740,809
1904.....	259,421	1,611,356	144,706	2,015,483
1905.....	761,756**	1,636,214	176,805	2,574,775
1906.....	1,000,372	1,692,359	220,504	2,913,235
1907*.....	770,686	1,422,880	178,240	2,371,806
1908.....	1,079,556	2,190,784	267,720	3,538,060
1909.....	815,033	1,716,887	190,235	2,722,155
1910.....	1,341,310	1,859,302	218,232	3,418,844
	6,637,455	16,885,688	1,977,595	25,500,738

\*9 months ending March 1907.

\*\*Includes fireclay classified as "for use in process of manufactures."

Dr. Heinrich Ries, who is investigating the clay resources of Canada for the Geological Survey, reports with respect to the clay working industry in the western provinces: 'The main clay-working industry at the present time is the manufacture of common brick, but the product in many localities, as around Victoria and Vancouver, does not supply the entire demand, and common brick are imported in large quantities from Seattle, Washington.

'Dry-pressed brick are made in small quantities at a number of points, but the only plants of large capacity are those at Medicine Hat and Clayburn.

'Most of the pressed brick now used in the western provinces are imported, and command a high market value. The same is true of fireproofing, terra-cotta, firebrick, pottery, and sewerpipe.

'It will be seen, therefore, that there is room for abundant development and expansion in the home clay-working industries.'

*Clay Building Brick.*—The total production of clay building brick, including the common and pressed varieties, but excluding ornamental, paving, and firebrick, is shown by provinces for the past four years in the following tables.

In 1910 the total production was 695,610,353, valued at \$5,912,648, made up of: 627,715,319 common, valued at \$5,105,354, or an average value per thousand of \$8.13; and 67,895,034 pressed brick, valued at \$807,294, or an average value per thousand of \$11.89. There were 397 active firms reporting as compared with

386 in 1909, and the value of production shows an increase of \$1,069,547, or 22 per cent.

In 1909 the total production was 596,493,364, valued at \$4,843,101; made up of: 539,228,708 common, valued at \$4,212,424, or an average value per thousand of \$7.81; and 57,264,656 pressed brick, valued at \$630,677, or an average value per thousand of \$11.01.

In 1908, the total production was 406,742,030, valued at \$3,128,734; made up of: 353,261,268 common, valued at \$2,611,554, or an average value per thousand of \$7.39; and 53,480,764 pressed brick, valued at \$517,180, or an average value per thousand of \$9.67.

In 1907, the total production was 517,937,648, valued at \$4,250,246; made up of: 439,015,556 common, valued at \$3,455,524, or an average value per thousand of \$7.87; and 78,922,092 pressed brick, valued at \$794,722, or an average value per thousand of \$10.07.

### Production of Clay Building Brick (Common and Pressed) 1909 and 1910.

Province.	1909.				1910.			
	No. of active firms reporting.	No. sold.	Value.	Per cent of total value.	No. of active firms reporting.	No. sold.	Value.	Per cent of total value.
			\$				\$	
Nova Scotia.....	12	18,875,000	114,795	2.37	15	18,730,000	113,436	1.92
New Brunswick.....	6	6,170,000	44,330	0.91	4	3,950,000	31,350	0.53
Quebec.....	54	101,471,567	690,918	14.27	62	130,287,310	929,492	15.72
Ontario.....	237	322,524,414	2,557,068	52.80	235	342,119,078	2,785,361	47.11
Manitoba.....	21	59,110,000	544,548	11.24	22	75,834,550	746,704	12.63
Saskatchewan.....	13	14,416,770	144,316	2.98	11	14,733,340	160,850	2.72
Alberta.....	28	45,479,855	441,606	9.12	29	73,639,771	750,982	12.70
British Columbia.....	15	28,445,758	305,520	6.31	19	36,316,304	394,473	6.67
Totals: .....	386	596,493,364	4,843,101	100	397	695,610,353	5,912,648	100

# Production of Clay Building Brick (Common and Pressed) 1907 and 1908.

Province.	1907.			1908.		
	No. Sold.	Value.	Per cent of total value.	No. Sold.	Value.	Per cent of total value.
		\$			\$	
Nova Scotia.....	19,646,000	110,338	2.60	9,125,000	56,064	1.79
New Brunswick.....	4,941,141	36,937	0.87	6,594,011	54,573	1.74
Quebec.....	104,394,709	715,922	16.84	90,667,177	601,874	19.24
Ontario.....	287,930,763	2,311,499	54.38	221,600,575	1,664,184	53.19
Manitoba.....	45,094,180	465,282	10.95	26,818,000	254,591	8.14
Saskatchewan.....	12,024,070	125,459	2.95	8,262,996	87,566	2.80
Alberta.....	31,384,740	353,672	8.32	25,521,911	240,336	7.68
British Columbia.....	12,522,045	131,137	3.09	18,152,362	169,546	5.42
Totals.....	517,937,648	4,250,246	100.00	406,742,032	3,128,734	100.00

The production in the Maritime Provinces shows a slight falling off, although this may in part be due to incompleteness of the record, as only four firms in New Brunswick made returns in 1910 as compared with six in 1909.

The production in Quebec shows an increase of \$238,574 or 34.5 per cent; returns having been received from 62 active firms in 1910, as compared with 54 in 1909.

The Ontario production, which contributes 47 per cent of the total, shows an increase of \$228,293, or 8.9 per cent over 1909.

In the western provinces particularly, the production of building brick has greatly increased; the production in Manitoba was greater by \$202,156 or 37.1 per cent than in 1909. Saskatchewan's production was increased by \$16,534 or 11.5 per cent; that of Alberta by \$309,376 or 70.1 per cent, and of British Columbia by \$88,953 or 29.1 per cent.

The exports and imports of building brick since 1891 and 1880 respectively are shown in the two following tables. The exports have never been large, averaging for a number of years past about \$6,000 in value per annum; but falling in 1909 and 1910 to \$2,255 and \$2,762 respectively. The annual imports for a number of years previous to 1903 averaged only about \$20,000 in value; during the past seven years, however, the value of the imports has varied from \$100,000 to over \$200,000 per annum. During the calendar year 1910, the imports were 29,049,000 brick valued at \$274,482: of which 1,993,000 valued at \$26,447, an average of \$13.27 per thousand, were imported from Great Britain; and 27,056,000 valued at \$248,035, an average of \$9.45 per thousand, from the United States. The imports during the calendar year 1909 were 27,972,000 brick, valued at \$195,360: of which 1,738,000 valued at \$21,680, an average of \$12.47 per thousand, were imported from Great Britain; and 26,234,000 valued at \$173,680, an average of \$6.62 per thousand, from the United States.



## Exports of Building Brick.

Calendar Year.	M.	Value.	Calendar Year.	M.	Value.	Calendar Year.	M.	Value.
		\$			\$			\$
1891.....	246	1,163	1898.....	65	442	1904.....	696	5,357
1892.....	1,963	12,192	1899.....	172	1,351	1905.....	754	5,883
1893.....	6,073	44,110	1900.....	546	4,528	1906.....	697	6,541
1894.....	1,095	7,405	1901.....	646	5,189	1907.....	802	6,193
1895.....	1,655	8,665	1902.....	2,110	12,786	1908.....	2,344	9,047
1896.....	983	5,678	1903.....	891	5,699	1909.....	365	2,255
1897.....	573	2,679				1910.....	390	2,762

## Imports of Building Brick.

Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.
		\$			\$			\$
1880.....	340	2,067	1891.....	589	9,744	1902.....	4,087	33,802
1881.....	415	4,281	1892.....	621	5,075	1903.....	2,881	28,498
1882.....	3,500	24,572	1893.....	1,489	14,108	1904.....	13,455	117,468
1883.....	1,448	14,234	1894.....	2,220	18,320	1905.....	25,515	168,122
1884.....	3,263	20,258	1895.....	575	4,705	1906.....	21,934	194,897
1885.....	3,108	14,632	1896.....	1,057	23,189	1907 (9 mos.)	8,495	88,144
1886.....	983	5,929	1897.....	2,094	10,336	1908.....	13,790	139,105
1887.....	276	2,440	1898.....	639	6,652	1909.....	10,894	103,773
1888.....	2,483	20,720	1899.....	2,611	21,306	1910.....	30,444	218,175
1889.....	2,590	24,585	1900.....	1,792	19,305			
1890.....	1,933	12,500	1901.....	2,800	20,677			

*Prices.*—The price of brick varies greatly with the quality, locality, market or demand; the values as given in the table of production are those at the yard or kiln and do not include costs of delivery. They do not, therefore, represent the price to the consumer. The average price of common brick at the kiln in 1910 according to these returns was \$8.13, as compared with \$7.81 in 1909; and of pressed brick \$11.89, as compared with \$11.01 in 1909.

In the Maritime Provinces, during 1910, the price of common brick varied from \$4.80 to \$9, averaging for Nova Scotia \$5.77, and for New Brunswick \$7.83.

In Quebec the price of common brick varied between \$4 and \$10, averaging \$6.63; while the price of pressed brick averaged \$15, with only one firm reporting production. The average price of common brick in Ontario was \$7.88, the limit of variation being \$4.70 and \$10; while for pressed brick the average was \$9.74 and the variation from \$8 to \$12.

In the western provinces the averages for common brick were fairly uniform from \$9.63 to \$9.81. In individual yards the prices varied from \$7.75 to \$12. Pressed brick in the west averaged \$16.27 per thousand in Manitoba; \$14.97 in Saskatchewan; \$19.01 in Alberta; and \$33.56 in British Columbia.



The following table shows the average values at the kilns of common and pressed brick in the several provinces during 1908, 1909, and 1910, as furnished by the producers:—

**Average Prices per Thousand of Common and Pressed Brick.**

	COMMON BRICK.			PRESSED BRICK.		
	1908.	1909.	1910.	1908.	1909.	1910.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Nova Scotia.....	5 81	5 69	5 77	13 84	12 36	12 27
New Brunswick.....	8 17	7 14	7 83	16 70	12 00	12 00
Quebec.....	6 37	6 38	6 63	11 62	14 00	15 00
Ontario.....	7 24	7 71	7 88	8 74	9 46	9 74
Manitoba.....	9 24	9 14	9 81	15 45	12 00	16 27
Saskatchewan.....	10 46	9 66	9 63	11 18	14 00	14 97
Alberta.....	8 60	9 21	9 63	12 97	13 03	19 01
British Columbia.....	9 21	9 73	9 77	20 40	31 05	33 56
Canada.....	7 39	7 81	8 13	9 67	11 01	11 89

*Ontario.*—This Province has for a number of years past produced over 50 per cent of the clay building-brick production in Canada, though the percentage in 1910 has fallen to 47. The vicinity of the city of Toronto, including the counties of York and Halton, is the principal brick making section and in 1910 produced about 62 per cent of the Ontario production, or about 29 per cent of the total Canadian production of brick.

The district next in importance is the county of Wentworth, comprising the city of Hamilton and vicinity, producing about 6 per cent of the Ontario production. The Ottawa district, including the counties of Russell and Carleton, also produced about the same amount. Other important districts are Algoma and Nipissing, which cover a wide area, and the counties of Waterloo, Middlesex, Grey, and Kent. These eleven counties contributed over 85 per cent of the Ontario production. Practically all the pressed brick reported as such was made in the Toronto and Hamilton districts.

## Production of Common and Pressed Brick by Principal Counties.

County.	COMMON.			PRESSED.			Total Value.	Per cent.
	No.	Value.	Per M.	No.	Value.	Per M.		
		\$	\$ c.		\$	\$ c.	\$	%
York.....	157,634,189	1,314,153	8 34	16,773,221	172,183	10 27	1,486,336	53.36
Halton.....				25,120,000	238,361	9 49	238,361	8.56
Wentworth.....	19,024,051	134,825	7 09	4,100,000	36,119	8 81	170,944	6.14
Russell.....	12,950,000	97,800	7 55				97,800	3.51
Carleton.....	9,664,000	87,231	9 03				87,231	3.13
Algoma.....	8,815,000	78,650	8 92				78,650	2.83
Nipissing.....	4,700,000	51,000	10 85				51,000	1.82
Waterloo.....	7,140,159	50,431	7 06				50,431	1.81
Middlesex.....	5,956,150	43,413	7 29	30,000	240	8 00	43,653	1.57
Grey.....	6,387,000	41,004	6 42				41,004	1.47
Kent.....	4,800,200	30,846	6 43	100,000	800	8 00	31,646	1.14
Total, 11 counties....	237,070,749	1,929,353	8 14	46,123,221	447,703	9 71	2,377,056	85.34
Total, other counties.	56,362,020	382,004	6 78	2,563,088	26,301	10 26	408,305	14.66
Total, Ontario.....	293,432,769	2,311,357	7 88	48,686,309	474,004	9 74	2,785,361	100.00

The annual production of common and pressed brick in this Province since 1898 as ascertained by the Ontario Bureau of Mines is shown in the following table. The figures show the total quantity and value of the brick made, as distinguished from the sales given in the previous table.

## Building Brick made in Ontario since 1898.

	COMMON BRICK.			PRESSED BRICK.		
	M.	Value.	Average per M.	M.	Value.	Average per M.
		\$	\$ cts.		\$	\$ cts.
1898.....	170,000	914,000	5.376	8,970	100,344	11.187
1899.....	233,898	1,313,750	5.617	10,808	105,000	9.715
1900.....	240,430	1,379,590	5.738	11,562	114,419	9.896
1901.....	259,265	1,530,460	5.903	12,846	104,394	8.127
1902.....	220,500	1,411,000	6.399	19,755	144,171	7.298
1903.....	230,000	1,561,700	6.790	23,703	218,550	9.220
1904.....	200,000	1,430,000	7.150	26,857	226,750	8.443
1905.....	250,000	1,937,500	7.750	26,000	234,000	9.000
1906.....	300,000	2,157,000	7.190	39,860	337,795	8.475
1907.....	273,882	2,109,978	7.704	69,763	648,683	9.298
1908.....	222,361	1,575,875	7.087	56,167	485,819	8.649
1909.....	246,308	1,916,147	7.779	53,167	490,571	9.227
1910.....	304,988	2,374,287	7.785	44,204	458,596	10.375

*Manitoba.*—The production of building brick in Manitoba in 1910 was 75,834 thousand valued at \$746,704, as compared with 59,110 thousand valued at \$544,548; an increase of 37 per cent in the value of production.

Mr. Joseph Keele, who is associated with Dr. H. Ries in an investigation of the clay resources of Canada, reports:—

“About twenty-six brickyards are in operation in Manitoba; of these about four produce dry press bricks, and the rest, with the exception of one stiff mud machine at Alsip’s yard in Winnipeg, turn out soft mud bricks.

“The burning is most easily done in scove kilns, the fuel being generally dry poplar wood, but a few of the more progressive plants have down draft kilns and burn coal. The season’s output varies from 500,000 to 12,000,000 in the various yards, the average length of the season being about 150 days.

“The principal difficulties met with by brickmakers using surface clays are: the liability of the green brick to air check while on the drying racks, and in judging the proper degree of burning. Calcareous clays have their points of incipient vitrification and fusion so close together that quantities of the brick near the arches are melted, while the upper layers, which receive the least amount of heat, are under-burned and soft, consequently there is great waste. It seems impossible to avoid this in scove kilns, but there is far less waste, and a greater economy of fuel in down draft kilns.

“If the clay is mined in the autumn, and allowed to weather in a stockpile over winter, subsequent air checking in the drying racks will be considerably reduced, the clay will be easier to work, and it will be available for use earlier in the spring; but only in one instance that came under my notice was this method taken advantage of.

“There was a great scarcity of brick in Manitoba during the early part of the building season of 1910. No brick were left over from the season of 1909, and on June 1 there was not a kiln of brick yet burned in the Province. On the night of June 2, about 2,000,000 brick were frozen on the drying racks, and consequently destroyed.

“Common brick usually sell in Winnipeg for \$11 per thousand, but this summer they sold as high as \$15, and as the local yards were unable to supply the demand large quantities were imported. Most of the pressed brick used for facing buildings is imported.

“All the structural hollow ware and sewerpipe used in the Province is imported, but the use of paving brick is prohibited by the high freight rates on such a heavy commodity.”

*Saskatchewan.*—Returns from eleven operating firms show a production in 1910 of 14,733 thousand brick, valued at \$160,850, as compared with 14,417 thousand and valued at \$144,316 in 1909.

The principal brick plants are located at Estevan, Prince Albert, Saskatoon, Rosthern, Verigin, and Yorkton.

*Alberta.*—Twenty-nine operating firms reported a production of 73,640 thousand brick valued at \$750,982, as compared with 45,480 thousand valued at \$441,606 in 1909 by twenty-eight firms; showing an increase in value of production of \$309,376 or about 70 per cent. As in the other western provinces, the pro-

duction has been rapidly increasing. Several new plants were in course of construction during the year which were expected to be ready for operation during 1911. The principal centres of present production are Edmonton, Calgary, Medicine Hat, and Lethbridge.

*British Columbia.*—The production during 1910 by nineteen active firms was 36,316 thousand brick valued at \$394,473. These statistics include reliable estimates for two firms that did not report directly to this Department. The production by fifteen firms in 1909 was reported as 28,445 thousand brick valued at \$305,520. The average price at the yard of common brick during the year was \$9.77, while pressed brick sold at from \$20 to \$40 per thousand. Vancouver, New Westminster, Port Haney and vicinity, Victoria, and Sydney are the principal centres for the production of common brick, while pressed brick are made in considerable quantities at Clayburn.

*Paving Brick.*—Hitherto the only paving brick made in Canada have been those made at West Toronto from shale found on the banks of the Humber river. A beginning has, however, now been made in the manufacture of paving brick in British Columbia at Clayburn, by the Clayburn Brick Co., from shales found in Sumas mountain. The annual production in Ontario has been fairly constant at from 3,000,000 to 5,000,000 brick per season, and the output finds a market chiefly in Toronto. Statistics of production are available since 1897 and are shown in the next table; the average price per thousand has varied from \$8 to \$20.

In 1910 the number of paving brick sold was 4,215,000, valued at \$78,980, while during the same year there were imported 10,503 thousand paving brick, valued at \$124,994. These imports include: 2,786 thousand, valued at \$29,936, or \$10.75 per thousand, from the United States, and 7,717 thousand, valued at \$95,058, or \$12.32 per thousand, from Great Britain.

Annual Production of Paving Brick.\*

Year.	M.	Value.	Average per M.	Year.	M.	Value.	Average. per M.
		\$	\$ cts.			\$	\$ cts.
1897.....	4,568	45,670	10 00	1904.....	4,436	55,450	12 50
1898.....				1905.....	4,500	54,000	12 00
1899.....	5,300	42,550	8 03	1906.....	3,000	45,000	15 00
1900.....	2,710	26,950	9 94	1907.....	3,618	72,354	20 00
1901.....	3,689	37,000	10 03	1908.....	3,720	59,456	15 98
1902.....	4,211	42,000	9 97	1909.....	3,760	67,408	17 93
1903.....	3,789	45,288	11 95	1910.....	4,215	78,980	18 74

(\*) Figures previous to 1907 compiled from Ontario Bureau of Mines.



## Imports of Paving Brick.\*

Fiscal Year.	M.	Value.	Average per M.	Fiscal Year.	M.	Value.	Average per M.
		\$	\$ cts.			\$	\$ cts.
1895.....	275	5,006	18 20	1903.....	1,337	18,811	14 07
1896.....	918	10,132	11 04	1904.....	1,986	29,753	14 98
1897.....	52	719	13 83	1905.....	3,350	32,578	13 86
1898.....	367	2,337	6 37	1906.....	4,104	46,008	11 21
1899.....	1,583	23,648	14 94	1907 (9 mos.).....	2,182	23,256	10 66
1900.....	2,175	35,644	16 39	1908.....	5,340	61,346	11 49
1901.....	900	10,414	11 57	1909.....		101,187	†
1902.....	1,030	16,788	16 30	1910.....		138,763	

\*Duty 20 per cent.

†The imports during July, 1908, under the general tariff, are reported as 6,581 M., value \$7,317, an apparent error. There appears also to be an error in the entries for July, August, and September of the same year. The total number has, therefore, been omitted. The actual value of the imported brick varies from \$10 to \$12 per M.

*Fireclay and Fireclay Products.*—There are a number of clays from different localities that have been used in the manufacture of refractory brick or firebrick, and for furnace linings, etc., which have been usually termed fireclays. These include clays found with the coal measures at Westville, Nova Scotia, and at Comox, Vancouver island; also clays found south of Moosejaw, Saskatchewan, and at Clayburn, near the city of Vancouver, British Columbia. Stove lining and other refractory clay products are made at several places in Ontario and Quebec from imported fireclays.

The total value of the sales of fireclay, firebrick, and fireclay products in 1910 was \$50,215; as compared with a valuation of \$78,132 in 1909, \$110,302 in 1908, and \$131,322 in 1907.

The production in 1910 comprised 1,375,400 firebrick valued at \$29,352, or an average of \$21.34 per thousand; fireclay sold was 1,425 tons valued at \$5,863, and other fireclay products valued at \$15,000.

The production of 1909 comprised 1,059,270 firebrick valued at \$32,742, or an average of \$30.92 per thousand; fireclay sold, 4,405 tons valued at \$12,390, and other fireclay products valued at \$33,000.

Fireclay products in 1908 included 2,415,871 firebrick valued at \$70,429, an average of \$29.16 per thousand; fireclay sold, 1,984 tons valued at \$8,121, and other fireclay products valued at \$31,752. The 1907 production comprised 4,323,179 firebrick, valued at \$113,322, an average of \$26.21 per thousand; and other fireclay shapes to the value of \$18,000.

The imports of firebrick during the calendar year 1910 were valued at \$811,927: of which \$734,908 worth were imported from the United States and \$76,902 from Great Britain. Fireclay was imported during the calendar year 1910 to the value of \$124,293, as compared with a value of \$86,161 in 1909.

The following table gives a record of the imports of fireclay and firebrick since 1900, the figures being in each case for the fiscal year.



## Imports of Firebrick and Fireclay, 1900-10.

Fiscal Year.	Fireclay.	Firebrick.	Fiscal Year.	Fireclay.	Firebrick.
	\$	\$		\$	\$
1900.....	59,291	39,535	1906.....	131,130	51,892
1901.....	79,530	32,831	1907*.....	85,044	349,185
1902.....	64,541	45,608	1908.....	155,873	639,347
1903.....	94,509	34,522	1909.....	77,146	350,457
1904.....	52,716	38,335	1910.....	86,151	519,454
1905.....	73,837	44,746			

\*9 months ending March.

*Sewerpipe and Drain Tile.*—The total value of the sales of sewerpipe in 1910 was \$774,110; as compared with a value of \$645,722 in 1909, and a value of \$514,362 in 1908.

The imports of drain pipe and sewerpipe during the calendar year 1910 were valued at \$175,599: of which \$140,259 worth were imported from the United States, \$35,149 from Great Britain, and \$191 from other countries.

The imports of sewerpipe during the calendar year 1909 were valued at \$170,280: of which \$135,809 worth were imported from the United States, \$34,200 from Great Britain, and \$271 from other countries.

Following is a list of firms manufacturing sewerpipe:—

Standard Drain Pipe Co. of St. Johns, Que., and New Glasgow, N.S.

Ontario Sewerpipe Company, Toronto, Ont.

Dominion Sewer Pipe Company, Toronto, Ont.

Hamilton and Toronto Sewer Pipe Co., Ltd., Hamilton, Ont.

B. C. Pottery Company, Victoria, B.C.

In addition to the above the Alberta Clay Products Company has built an extensive plant at Medicine Hat, Alberta, for the manufacture of brick, sewerpipe, and other clay products.

The production of drain tile as reported to this Branch was not as large in 1910 as during 1909. The total sales in 1910 were 24,562,648 valued at \$370,008, an increase of \$15.06 per thousand; as compared with sales of 27,571,097 valued at \$408,440, an average of \$14.81 per thousand, in 1909. The sales in 1908 were reported as 20,418,000, valued at \$298,561. The Ontario Bureau of Mines reports the total number made in that Province during 1910 as 21,028,000, valued at \$318,456, or an average of \$15.14 per thousand; as compared with 27,418,000 valued at \$363,550, or an average of \$13.25 per thousand, in 1909. The sales in Ontario during 1910, according to direct returns to this Branch, were 22,810 thousand, valued at \$334,402, or 93 per cent of the total production in Canada.

The imports of unglazed drain tile are comparatively small, the value during the calendar year 1910 being \$4,485 only, as compared with \$2,785 in 1909.

Statistics of the annual production of sewerpipe and of the imports of drain tile and sewerpipe are shown in the next three tables.

## Production of Sewerpipe, etc.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1888.....	266,320	1896.....	153,875	1904.....	440,894
1889.....	Not available	1897.....	164,250	1905.....	382,000
1890.....	348,000	1898.....	181,717	1906.....	350,045
1891.....	227,300	1899.....	161,546	1907.....	667,100
1892.....	367,660	1900.....	231,525	1908.....	514,362
1893.....	350,000	1901.....	248,115	1909.....	645,722
1894.....	250,325	1902.....	301,965	1910.....	774,110
1895.....	257,045	1903.....	317,970		

## Production of Drain Tile in Ontario.

(As ascertained by the Ontario Bureau of Mines).

Year.	No.	Value.	Year.	No.	Value.	Year.	No.	Value.
		\$			\$			\$
1891....	7,500,000	90,000	1898....	22,668,000	225,000	1905....	15,000,000	220,000
1892....	10,000,000	100,000	1899....	21,027,400	240,246	1906....	17,700,000	252,500
1893....	17,300,000	190,000	1900....	19,544,000	209,738	1907....	15,578,000	250,122
1894....	25,000,000	280,000	1901....	21,592,000	231,374	1908....	24,800,000	338,658
1895....	14,330,000	157,000	1902....	17,510,000	199,000	1909....	27,418,000	363,550
1896....	13,200,000	144,000	1903....	18,200,000	227,000	1910....	21,028,000	318,456
1897....		*	1904....	16,000,000	210,000			

\*Not stated.

## Imports of Drain Tile and Sewerpipe.

Fiscal Year.	Drain Tile (a)	Sewerpipe (b).	Fiscal Year.	Drain Tile (a)	Sewerpipe (b).
	\$	\$		\$	\$
1880.....		33,796	1896.....	339	18,957
1881.....		37,368	1897.....	416	33,870
1882.....		70,061	1898.....	157	29,454
1883.....		70,699	1899.....	1,817	32,071
1884.....	5,585	66,170	1900.....	1,383	37,766
1885.....	2,911	66,678	1901.....	1,264	54,819
1886.....	1,905	56,048	1902.....	269	55,261
1887.....	2,183	69,020	1903.....	252	57,100
1888.....	4,290	96,967	1904.....	1,637	53,958
1889.....	2,346	80,869	1905.....	1,229	101,166
1890.....	3,780	73,654	1906.....	4,727	131,353
1891.....	673	86,522	1907 (9 mos.).....	12,106	93,453
1892.....	473	59,064	1908.....	2,080	125,747
1893.....	110	38,891	1909.....	2,394	106,399
1894.....	53	24,572	1910.....	2,739	196,002
1895.....	695	20,358			

(a) Drain tile, not glazed.

(b) Drain pipes, sewerpipes, and earthenware fittings therefor, chimney linings, or vents, chimney tops and inverted blocks, glazed or unglazed.

*Pottery and Earthenware.*—The pottery made from Canadian clays has been, hitherto, chiefly of the common grades, such as flowerpots, jardinières, crocks, jars, churns, etc. A number of potters make a higher grade product of stoneware, but the majority of these use imported clays. Sanitary ware is made at St. Johns, Que., and other points; but the raw material, including clays and feldspar, is nearly all imported.

The total value of the production of pottery and clay sanitary ware in 1910, according to returns received, was \$250,924; as compared with a valuation of \$285,285 in 1909, and \$200,541 in 1908. Annual statistics of production are shown herewith.

### Annual Production of Pottery.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1888.....	27,750	1886.....	163,427	1904.....	140,000
1889.....	Not available	1897.....	129,629	1905.....	120,000
1890.....	195,242	1898.....	214,675	1906.....	150,000
1891.....	258,844	1899.....	185,000	1907.....	253,809
1892.....	265,811	1900.....	200,000	1908.....	200,541
1893.....	213,186	1901.....	200,000	1909.....	285,285
1894.....	162,144	1902.....	200,000	1910.....	250,924
1895.....	151,588	1903.....	200,000		

Details of the imports of earthenware and chinaware showing the values imported and countries of origin have already been given on pages 15, 16, and 17,

The total imports in 1910 were valued at \$2,283,116, as compared with a value of \$1,781,759 in 1909. These imports are subdivided into eight classes and in 1910 include: brown coloured ware, \$53,413; demijohns, churns, and crocks, \$6,607; tableware of china, porcelain, white granite, \$1,545,538; china and porcelain, \$95,509; tiles or blocks of earthenware or stone prepared for mosaic flooring, \$90,524; earthenware tiles, N.O.P., \$125,772; manufactures of earthenware, N.O.P., \$163,278; earthenware, N.O.P., \$202,475. Great Britain is the principal source of the imports of this class of products, but quite large supplies are also obtained from the United States, Germany, France, Austria-Hungary, Japan, and other countries.

## Imports of Earthenware and Chinaware.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	322,333	1891.....	634,907	1902.....	1,275,093
1881.....	439,029	1892.....	748,810	1903.....	1,406,610
1882.....	646,734	1893.....	709,737	1904.....	1,611,356
1883.....	657,886	1894.....	695,514	1905.....	1,636,214
1884.....	544,586	1895.....	547,935	1906.....	1,692,359
1885.....	511,853	1896.....	575,493	1907 (9 mos.)....	1,422,880
1886.....	599,269	1897.....	595,822	1908.....	2,190,784
1887.....	750,691	1898.....	675,874	1909.....	1,716,887
1888.....	697,082	1899.....	916,727	1910.....	1,859,302
1889.....	697,949	1900.....	959,526		
1890.....	695,206	1901.....	1,114,677		

## Investigation of the Clay Resources of Canada.

An investigation of Canadian clay resources was initiated by the Mines Branch in 1905 when a report was prepared on the clay resources of Manitoba. This work has been continued under the Geological Survey Branch by Dr. Heinrich Ries, who has made similar investigations into the clay resources of many parts of the United States. Dr. Ries has been assisted in this work by Mr. Joseph Keele of the Geological Survey. The season of 1909 was spent in the Maritime Provinces and 1910 in the western provinces from Manitoba to British Columbia. Preliminary reports on these investigations have been published in the Summary Report of the Geological Survey for 1909 and 1910 and also in the Transactions of the Canadian Mining Institute for 1910 and 1911, and a complete report on the clay and shale deposits of Nova Scotia and portions of New Brunswick, has just been issued by the Geological Survey.<sup>1</sup>

The results of the field investigations in the Maritime Provinces, as published in the Summary Report of the Geological Survey for 1909, were quoted in the report of this Branch on the Production of Structural Materials and Clay Products, during 1909. With respect to the laboratory tests on these clays, Dr. Ries states:—

“The laboratory tests have shown that many of the Nova Scotia and New Brunswick clays and shales can be utilized for pressed brick manufacture, and as there are practically no producers of pressed brick eastward of Ontario, there would appear to be a good field for enterprise in this direction.”

Dr. Ries reports as follows on his field investigations during 1910:—

“The field work was begun at Winnipeg, Man., and extended westward as far as Victoria, B.C., but the present summary covers the territory between Regina and the coast.

“Samples were collected from many localities, for the purpose of testing; but as the laboratory investigation of these is not yet complete, only the mode of occurrence of the clays and shales, and the industry based thereon, is referred to.

<sup>1</sup> The clay and shale deposits of Nova Scotia and portions of New Brunswick, Memoir No. 16-E.



"With reference to the geographic distribution of the clays and shales, it may be pointed out that the most extensive and important deposits lie east of the Cordilleran area, in other words, in the region of the Great Plains; while second in extent are the deposits of the Pacific coast belt.

"Few or none are found in the region lying between the eastern boundary of the Rocky Mountains and the Coast ranges.

"Geologically, the clays and shales show a somewhat restricted distribution, ranging from Jurassic to Pleistocene.

"For convenience of description the occurrences may be divided into three areas, viz.: The Great Plains, the Cordilleran, and the Pacific coast.

#### GREAT PLAINS REGION.

"In that portion of the Great Plains area lying west of the longitude of Regina and Prince Albert, surface clays and silts are abundantly distributed, and often used locally for the manufacture of common brick. The product thus made is usually of red colour, and often highly porous, but since in many districts no other material is locally available, it has to be used. Those clays which are strongly calcareous yield a buff brick.

"The Pleistocene clays and silts referred to above are in most cases glacial deposits, some of them containing small pebbles, at times of calcareous character. They are worked around Regina, Saskatoon, Prince Albert, Moosejaw, Medicine Hat, Red Deer, Cochrane, and other places of minor importance.

"At some points, as Edmonton, flood plain deposits are extensively employed for making common and pressed brick. In most cases, however, the surface clays are not adapted to pressed brick manufacture.

"There are certain areas, some of them rather extensive, that are underlain by clays and shales of Tertiary or Cretaceous age, which hold out strong promise for the future, and whose prospective value has been, in part at least, realized, even at the present time. I refer to the areas around Dirt hills, Souris valley, Medicine Hat, Edmonton, and Calgary.

"*Dirt Hills Area.*—This name is applied to a group of hills rising from the plains about 30 miles south of Moosejaw, and extending south and southeastward for some distance. The beds are of Laramie age; and about 23 miles south of Drinkwater, on the Portal branch of the Canadian Pacific railway, there are exposed a series of white and brown clays in the outer slopes of the Dirt hills. The beds appear to dip westward, and the hills in which the clays occur have a steep eastern face, and a western slope conformable to the dip.

"The predominant beds are white and greyish white sandy clays, and brownish red siliceous clay shales, as well as some gypsiferous beds and bluish clays. The white sandy beds, which form the larger part of three hills, are quite prominent, and contain occasional lenses of a finer grained white clay.

"The succession of beds, from the bottom up, where the white clays are best exposed, appears to be as follows:—



Brownish clay-shales.  
 Soft sandstone.  
 Grey clay.  
 White sandy clay.  
 Thin beds of purplish and bluish shale.  
 Brownish clay-shales.  
 White and grey clays.

"The white clays are fireclays, fusing at cones 30 to 32.

"Some of the white sandy clay has been hauled up to Moosejaw and made into boiler setting brick, with good results.

"The practical development of these clays hinges upon a satisfactory solution of the transportation problem, and this may occur at no distant date, as there is said to be a projected branch of the Canadian Northern, which will pass within three miles of these clay deposits.

"*Souris Valley*.—The lignite seams of the Souris coal-field have been described by Dowling,<sup>1</sup> and in his paper mention is made of the sandstones and shales which are interbedded with the lignites. There seems little doubt that many of these shales could be utilized for the manufacture of clay products, but up to the present time not much has been done to develop them.

"The only locality at which they are worked is at Estevan, Sask., where the shales belonging to the upper member of the coal series in that field are mined by the Estevan Coal and Brick Company.

"The section shown in their workings is as follows:—

Top glacial clay. . . . .	10 to 20 ft.
Lignite. . . . .	8 ft.
Parting clay shale. . . . .	2 to 2½ ft.
Lignite. . . . .	8" to 2 ft.
Blue clay shale upper 15 feet smooth. . . . .	30 to 40 ft.

"The top clay, which is highly calcareous and cream burning, is used for making common brick.

"The shale, which is won by drift mining, is used for making dry-pressed brick. It is red burning.

"Shales are found at a number of other points in the Souris River coal field, but some of them crack in air-drying. One very smooth plastic deposit was found overlying the clay at Pinto.

"*Medicine Hat*.—This town lies in the Belly River shale area, the beds of this formation being exposed at a number of points along the Saskatchewan river, as well as in the slopes of some of the surrounding hills, where the shales have not been removed by pre-glacial erosion, or are not covered by glacial clays or silts.

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<sup>1</sup>Can. Geol. Survey, Annual Report, Vol. XV, pt. F.

"It may be said of the shales of this area in general, that they consist of more or less lenticular bodies of clay shales, and shales which are sometimes separated by lenses of sandstone.

"The lenticular character of the beds is proven by the fact that their structural relations can sometimes be well seen in one excavation, and also because sections on opposite sides of the river may be totally unlike so far as regards the beds over and underlying the same coal seams.

"The shales show a variety of colours, and range from highly siliceous to those of very fine grain. Some of the beds evidently contain a large amount of colloidal material, and have to be dried very slowly to prevent cracking, but this cannot always be avoided. Some of them may be cured of cracking by pre-heating, and experiments are now under way to determine this.

"Most of the shales of the Medicine Hat region are not refractory, and only one of the beds thus far opened up is claimed to be a good fireclay.

"The Belly River shales are now worked near Coleridge, and Red Cliff. At the former locality the shales outcrop on the slope of a steep ridge, and are said to have been tested by 80 ft. borings. The beds show the usual lenticular arrangement, and since the lenses vary in character, and are interbedded in places with sandstone, some selective mining and sorting is necessary. Among the types of clay thus far identified here by the owners are: sewerpipe, pressed brick, and fireclay.

"The shales are loaded on cars, which are run down a spur to the Canadian Pacific railway, and thence to Medicine Hat, where they are to be used at the new and extensive plant of the Alberta Clay Products Company.

"At Red Cliff, 6 miles up the Saskatchewan river from Medicine Hat, a somewhat deep section is exposed in a coulee running from the top of the cliff down to the river level. The shale bank has been opened up about half way down the coulee, and the section is somewhat as follows:—

Shales with sandstones. . . . .	50 feet.
Dark, chocolate clay, checks in drying. . . . .	3 "
Alternating shales, silts, and some lignite seams. . . . .	30 "
Lignite. . . . .	5 "
Sandy shales. . . . .	15 "
Lignite. . . . .	4-5 "
Carbonaceous shale. . . . .	2 "
To river level (concealed) about. . . . .	50 "

"The run of the bank is used for making a red, wire-cut brick, while one bed in the upper part of the bank is employed for dry press. All of the shales are red-burning, and it is not likely that any of them are refractory.

"The raw material is worked up in the recently established plant of the Red Cliff Brick Company.

"Directly across the river is another coulee, showing an equally deep section, but the beds are entirely different, and are mostly very sandy in character.

"*Edmonton.*—There are four possible sources of clay or shale in this area as follows:—

"(1). Flood plain clays, of very silty or even sandy character, underlying the low terrace bordering the Saskatchewan river. This material is used for common and pressed brick.

"(2). Glacial (?) clays of highly plastic character, underlying the upper level terrace on which Stratheona and Edmonton stand.

"(3). Shales underlying many of the coal seams, and usually too thin to be utilized.

"(4). Shales higher up in the section than the coal seams at Edmonton and Stratheona.

"The last named appear to represent the best type of material found in the immediate vicinity of Edmonton. The best observed exposures lie just northeast of Stratheona, in the valley of Mill creek, and along the Edmonton, Yukon, and Pacific railway. They are exceedingly plastic, and are said to burn to a vitrified body. No claim is made for a high refractoriness, and some of them have a rather high air shrinkage. This horizon should be carefully prospected to determine the occurrence of clays at other localities.

"The development of the clays around Edmonton is a matter of the highest commercial importance, as the demand there for all grades of structural clay products is large.

"South of Edmonton, between that point and Calgary, Tertiary shales are found outcropping along the Red Deer river, near the town of Red Deer. Some of those weather to a very plastic clay, but they are not utilized.

"*Calgary.*—The Cretaceous shales are the most important clay resources of this district. They evidently underlie a considerable area, but at most points the outcrops have been obscured by glacial drift. The shales have, however, been opened up for miles west of Calgary. At both points the bank shows massive layers of grey and buff shale, interbedded with beds of sandstone up to 2 and 3 feet in thickness. The latter have to be rejected in quarrying.

"Although the shales contain sufficient lime carbonate to effervesce briskly with acid, there is not sufficient to destroy the red burning character of the material. It is used at both localities for making dry pressed brick.

"At Cochrane, west of Calgary, there are somewhat extensive exposures of shale, some of which are free from the sandstone beds, so abundant at the two localities mentioned above.

"*Other Localities.*—The Belly River shales are well exposed along the Belly river at Lethbridge, and also in the workings of the coal mines there. Those associated with the coal are often highly carbonaceous, and often gritty, but some, such as those exposed along the wagon road near the bridge across the river, work up to a very plastic mass, even though they appear rather unpromising in the outcrop.

"There are also abundant shale beds from 2 to 6 or 8 feet in thickness, interstratified with Cretaceous sandstones, in the low foothills west of Lundbreck.

They are best seen in the railway cuts between that town and Hillcrest. Their value and character cannot be definitely stated until the tests on them are completed.

"A somewhat important shale bed overlies the coal along the south fork of the Oldman river, 6 miles northwest of Pincher creek, and other Cretaceous clays outcrop in the creek bank on the western edge of the town, as well as several miles to the southwest along Mill creek.

"Cretaceous shales of gritty character have also been quarried at Seebe siding, east of Kananaskis. Eastward from there along the Bow river, Cretaceous outcrops are frequent, and the entire section should be carefully searched.

#### CORDILLERAN REGION.

"The occurrence of extensive clay deposits was not expected in this region, but nevertheless all reasonable precautions were taken to search for them.

"In the Crowsnest Pass district, the Fernie shales have been utilized at Blairmore for making a red, dry-pressed brick, of good quality. Similar shales occur at Coleman.

"Shales are associated with the coal seams at Canmore and Bankhead, but are not adapted to brick manufacture.

"Flood plain and glacial clay deposits of small extent occur in many of the valleys, and are worked at several localities, including Nelson, Castlegar Junction, Kamloops, and Enderby.

"A deposit of colluvial clay, derived from the phyllites on the slopes of Mount Stephen, is found at Field, and a fine-grained plastic clay, suitable for earthenware, occurs in the Yoho valley.

"From the preceding paragraphs it will be seen that no fireclays appear to be known in the Cordilleran region. This is unfortunate, since there are several smelters, and numerous coke ovens in operation, which now have to obtain their supplies of firebrick from the United States and England.

"It is hoped that this demand will be supplied in the future by bricks made from the fireclays at Clayburn, or possibly those of the Dirt hills, or even the fireclay (if it proves to be such) at Medicine Hat.

#### PACIFIC COAST BELT.

"The Tertiary beds of Sumas mountain, near Clayburn, contain one of the most interesting series of shales to be found in the western provinces.

"The section involves a series of shales, sandstones, and at least one conglomerate. Some quartz porphyry is present, but not in contact with the worked shale deposits.

"The entire series appears to dip southwest at an angle of about  $15^{\circ}$  to  $20^{\circ}$  and the shales range from those of a highly refractory character to others of much lower refractoriness. On this account some of the shales burn buff, and others red.



"At the base of the section, there appear to be at least two beds of fireclay, the lowest one divisible in some places into three parts. Of these the lowest bench is called a china-clay, and is said to burn white, but our tests show that it does not. The middle and upper bench are separated by a seam of coal, of variable thickness and containing flint clay partings. Some of the best fireclay in the mine has a fusing point of cone 32.

"These shales are said to be adapted to the manufacture of pressed, paving, and firebrick, and sewerpipe.

"Pleistocene clays are found on the lower slopes of the mountain, and can be used for common brick.

"There is now a factory in operation at Clayburn, that of the Clayburn Brick Company. A narrow gauge road has been laid for a distance of 3 miles up a gulch in Sumas mountain, and the total rise in this distance is 450 feet. The mines belonging to the Company are located along the line of this railway.

"Other deposits not yet developed are found on the opposite side of the mountain, but these will probably be opened up before long.

"Around Vancouver, along the Fraser river, at least as far east as New Westminster, and at Sumas mountain, as well as other points, there are deposits of a bluish grey stratified Pleistocene clay, which usually forms lenticular deposits, surrounded by coarse sand. The clay is of value for common bricks and is worked at New Westminster, Clayburn, Port Haney, etc.

"A glacial clay is employed for common and pressed brick manufacture on Anvil island, in Howe sound. Similar material is also worked on Sidney island, and around Victoria.

"Sewerpipe and fireproofing are made at Victoria from shales obtained near Comox, Vancouver island, and residual fireclay from the northwest end of the same island."

Mr. Keele reported as follows with respect to field investigations in Manitoba:—

"About 20 samples of clays and shales were collected at various worked and unworked localities. The limitations and possibilities of these materials will be fully considered in a report to be issued after the series of tests that are now in progress are completed.

"The material available for structural purposes is obtained from two sources—surface clays and shales.

"The surface clays, which are usually lake or estuarine deposits, some of which may be of direct glacial origin, are the most widespread. Notwithstanding the fact that these surface deposits are, in many places, of great depth, only a limited portion of them unfortunately can, in some localities, be utilized by the clay worker. This is the case in the neighbourhood of Winnipeg, where only about 3 feet of the deposit can be used, and although there is often as much as 40 feet of clay of different quality beneath this, it is quite unsuitable for brick-making purposes. At Brandon the surface deposits consist of stratified sands,

<sup>1</sup> Summary Report of the Geological Survey Branch, Department of Mines, 1910, p. 181.



silts, and clays, with the sandy and silty layers so much in excess that good hard brick cannot be produced from them.

"At Portage la Prairie, Virden, Hartney, and Gilbert Plains, there are good deposits of clay, which can be worked to as great a depth as the brickyard owners desire. There is only a light covering of soil to be removed, and in places the brick clay comes almost to the grass roots.

"The surface clays in Manitoba are nearly all calcareous, the lime content being usually high. The underburned bricks made from them are of a light red colour, and soft and porous; the fully burned bricks are hard, light buff in colour, and make a good durable building material.

"Shales of Cretaceous age form the bed-rock of most of the western portion of the Province, but on account of the thick mantle of surface deposits, they are not generally seen outcropping. They outcrop plentifully at some localities, however, notably at the Riding, and Pembina mountains, and at two points are worked for brickmaking purposes. The shales, where exposed, are generally hard and non-plastic, so that when finely ground and mixed with water they cannot be moulded into shapes; but in some cases they are decomposed by weathering, and have become quite soft and plastic. The shale used for making dry press brick at Leary siding is in this condition. The shales burn to a red colour, and will stand much harder firing than the surface clays."

## LIME.

The production of lime during 1910 did not show as large an increase over the previous year's output as did the other structural materials. The total sales were reported as 5,848,146 bushels, valued at \$1,137,079, or an average of 19 cents per bushel; as compared with 5,592,924 bushels, valued at \$1,132,756, or an average of 20 cents per bushel in 1909.

Production was reported by 70 active firms as compared with 84 firms in 1909. The average number of men employed was reported as 976 and wages paid \$466,876. There was apparently a falling off in production in the Maritime Provinces and in Quebec and an increase in Ontario and the western provinces. The average price per bushel of sales was also lower in the east and higher in the west. Four firms only reported the sale of a small quantity of hydrated lime.

A small quantity of lime is annually made in Prince Edward Island, but from stone brought over from Nova Scotia, and the figures have been included in the statistics for this Province.

### Lime Production by Provinces, 1910.

Province.	No. of active firms reporting.	Men employed	Wages paid.	SALES.			
				Bushels.	Value.	Average per bushel.	Per cent of total.
			\$		\$	cts.	%
Nova Scotia.....	4	45	10,505	55,750	13,490	24	1.2
New Brunswick.....	6	109	42,524	470,050	105,593	22	9.3
Quebec.....	17	223	107,275	1,227,555	299,126	23	26.3
Ontario.....	31	410	180,557	2,988,020	476,137	16	41.9
Manitoba.....	5	95	48,707	606,679	100,808	17	8.8
Alberta.....	3	29	21,700	303,214	69,268	23	6.1
British Columbia.....	4	65	55,608	196,878	72,657	37	6.4
Total.....	70	976	466,876	5,848,146	1,137,079	19	100.0

## Lime Production by Provinces, 1908 and 1909.

Province.	1908.				1909.			
	Bushels.	Value.	Average per bushel.	%	Bushels.	Value.	Average per bushel.	%
		\$	cts.			\$	cts.	
Nova Scotia.....	51,068	16,102	32	2.3	57,730	16,729	29	1.5
New Brunswick...	155,748	34,262	22	4.8	697,466	154,151	22	13.6
Quebec.....	857,700	201,357	23	28.2	1,281,827	315,633	25	27.9
Ontario.....	2,087,731	358,507	17	50.3	2,619,553	434,147	17	38.3
Manitoba.....	138,786	24,192	17	3.4	423,954	69,670	16	6.2
Alberta.....	135,000	34,500	26	4.8	281,125	67,350	24	5.9
British Columbia..	176,435	44,027	25	6.2	231,269	75,076	32	6.6
	3,601,468	712,947	20	100.0	5,592,924	1,132,756	20	100.0

As with the other structural materials, Ontario is the largest producer, this Province being credited with about 42 per cent of the total value in 1910. Quebec was the second largest producer with 26 per cent of the total value, New Brunswick following with 9.3 per cent, and Manitoba with 8.8 per cent. The average price per bushel at kiln ranged from 16 cents in Ontario to 37 cents in British Columbia.

Statistics of the annual production of lime in Ontario as published by the Ontario Bureau of Mines are available since 1896 and are shown in the next table. With the exception of those for 1910 these returns are slightly higher than those obtained by the Mines Branch.

## Annual Production of Lime in Ontario.

(As ascertained by the Ontario Bureau of Mines.)

Calendar Year.	Bushels.	Value.	Cents per Bushel.	Calendar Year.	Bushels.	Value.	Cents per Bushel.
		\$				\$	
1896.....	1,800,000	222,000	12	1904.....	2,600,000	406,800	16
1897.....				1905.....	3,100,000	424,700	14
1898.....	2,620,000	308,000	12	1906.....	2,885,000	496,785	17
1899.....	4,342,500	535,000	12	1907.....	2,650,000	418,700	17
1900.....	3,893,000	544,000	14	1908.....	2,442,331	448,596	18
1901.....	4,100,000	550,000	13	1909.....	2,633,500	470,858	18
1902.....	4,300,000	617,000	14	1910.....	2,889,235	474,531	16
1903.....	3,400,000	520,000	15				

*Exports and Imports.*—The value of the lime exported during the calendar year 1910 was \$44,762, the destination of shipment being mainly the United States. The imports during the same period were 212,502 barrels, valued at \$138,847, and were also derived chiefly from the United States.

Annual statistics of exports and imports are given in the next tables:—

## Exports of Lime.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1891.....	119,853	1898.....	49,594	1905.....	85,723
1892.....	121,535	1899.....	73,565	1906.....	57,072
1893.....	86,623	1900.....	80,852	1907.....	55,903
1894.....	83,670	1901.....	99,194	1908.....	43,316
1895.....	71,697	1902.....	116,009	1909.....	48,821
1896.....	70,820	1903.....	131,412	1910.....	44,762
1897.....	53,177	1904.....	73,838		

## Imports of Lime.

Fiscal Year.	Barrels.	Value.	Fiscal Year.	Barrels.	Value.
		\$			\$
1880.....	6,100	6,013	1896.....	10,239	7,331
1881.....	5,796	4,177	1897.....	16,108	10,529
1882.....	5,064	5,365	1898.....	12,850	9,002
1883.....	7,623	9,224	1899.....	15,720	11,124
1884.....	10,804	11,200	1900.....	12,865	11,211
1885.....	12,072	11,503	1901.....	19,657	14,534
1886.....	11,021	9,347	1902.....	24,602	17,584
1887.....	10,835	8,524	1903.....	31,108	22,470
1888.....	10,142	7,537	1904.....	54,359	39,639
1889.....	13,079	9,363	1905.....	98,676	71,588
1890.....	8,149	5,360	1906.....	134,334	93,630
1891.....	6,259	4,273	1907 (9 mos.).....	88,919	67,573
1892.....	6,132	4,241	1908.....	129,379	99,611
1893.....	6,879	4,917	1909.....	153,934	106,263
1894.....	6,766	4,907	1910. Duty 20 per cent...	191,537	116,964
1895.....	12,008	5,743			

## SAND-LIME BRICK.

Returns were received from 13 firms producing sand-lime brick during 1910, showing total sales of 44,593,541, valued at \$371,857, or an average value of \$8.34 per thousand. The total sales by nine firms in 1909 were 27,052,864 brick valued at \$201,650, or an average of \$7.45 per thousand.

The number of men employed during 1910 was 267 and wages paid \$125,594. Annual statistics of production since 1907 are shown below:—

### Annual Production of Sand-Lime Brick.

Calendar Year.	Number.	Value.	Per M.
		\$	\$ cts.
1907.....	16,492,971	167,795	10 17
1908.....	17,288,260	152,856	8 84
1909.....	27,052,864	201,650	7 45
1910.....	44,593,541	371,857	8 34

The following is a list of manufacturers of sand-lime brick from whom returns of production were received:—

The Schultz Bros. Co., Ltd., Brantford, Ont.  
 Jno. Mann Brick Co., Ltd., Brantford, Ont.  
 The Silicate Brick Co., of Ottawa, Ltd., Ottawa, Ont.  
 The Peterboro Sandstone Brick Co., Ltd., Peterborough, Ont.  
 Toronto Indestructible Brick Co., Ltd., Toronto, Ont.  
 Canada Sand Lime Pressed Brick Co., Toronto, Ont.  
 The Port Arthur Sand Lime Brick Co., Port Arthur, Ont.  
 The Brandon Sandstone Co., Ltd., Brandon, Man.  
 Manitoba Pressed Brick Co., Ltd., Winnipeg, Man.  
 Winnipeg (Eli) Sandstone Brick Co., Winnipeg, Man.  
 Interocean Pressed Brick Co., Regina, Sask.  
 Calgary Silicate Pressed Brick Co., Calgary, Alta.  
 Victoria-Vancouver Lime and Brick Co., Victoria, B.C.



## SAND AND GRAVEL.

No statistics are available as to the production of sand and gravel, but the trade returns of the Customs Department show an export and an import of these materials for a number of years, of which a record is given in the accompanying tables:—

### Annual Exports of Sand and Gravel.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1893.....	329,116	121,795	1902.....	159,793	119,120
1894.....	324,656	86,940	1903.....	355,792	124,006
1895.....	277,162	118,359	1904.....	399,809	129,803
1896.....	224,769	80,110	1905.....	306,935	152,805
1897.....	152,963	76,729	1906.....	336,550	139,712
1898.....	165,954	90,498	1907.....	298,095	119,853
1899.....	242,450	101,640	1908.....	298,954	161,387
1900.....	197,558	101,666	1909.....	481,584	256,166
1901.....	197,302	117,465	1910.....	624,824	407,974

### Annual Imports of Sand and Gravel.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		\$			\$
1893.....	26,065	31,739	1902.....	47,381	58,668
1894.....	41,573	33,506	1903.....	91,518	95,647
1895.....	19,609	24,779	1904.....	110,634	107,547
1896.....	18,953	24,604	1905.....	85,339	92,722
1897.....	21,308	25,222	1906.....	116,500	173,727
1898.....	32,148	43,287	1907 (9 mos.).....	171,700	177,412
1899.....	30,288	42,209	1908.....	266,704	223,043
1900.....	35,713	41,280	1909.....	132,158	136,011
1901.....	35,749	42,891	1910.....	151,982	155,012

## SLATE.

The production of slate has shown little variation for a number of years, the output having been obtained entirely from the New Rockland slate quarries of Richmond county, Quebec, which are operated under lease by Messrs. Frazer and Davies.

The production in 1910 was reported as 3,959 squares, valued at \$18,492; as compared with 4,000 squares, valued at \$19,000, in 1909.

Statistics of annual production since 1886 are shown herewith:—

**Annual Production of Slate.**

Calendar Year.	Tons.	Value.	Calendar Year.	Squares.	Value.
		\$			\$
1886.....	5,345	64,675	1898.....		40,791
1887.....	7,357	89,000	1899.....		33,406
1888.....	5,314	90,689	1900.....		12,100
1889.....	6,935	119,160	1901.....		9,980
1890.....	6,368	100,250	1902.....		19,200
1891.....	5,000	65,000	1903.....	5,510	22,040
1892.....	5,180	69,070	1904.....	5,277	23,247
1893.....	7,112	90,825	1905.....		21,568
1894.....		75,550	1906.....		24,446
1895.....		58,900	1907.....	4,335	20,056
1896.....		53,370	1908.....	2,950	13,496
1897.....		42,800	1909.....	4,000	19,000
			1910.....	3,959	18,492

No exports of slate are reported for 1910. The imports, however, are quite large and in value aggregate nearly eight times the domestic production.

The total value of the imports during the calendar year 1910 was \$142,285, comprising: roofing slate, \$67,063; school writing slate, \$31,397; slate pencils, \$6,948; other slates and manufactures of slate, \$36,877. The imports of roofing slate, school writing slate, and manufactures of slates N.O.P. are chiefly from the United States. Some roofing slate is also imported from Great Britain, while slate pencils come principally from Germany and the United States.

Statistics of imports and exports are shown in the following tables:—

## Imports of Slate during the Years 1909 and 1910.

Slate and Manufactures of	12 months ending March, 1910.	12 months ending Dec., 1909.	12 months. ending Dec., 1910.
	\$	\$	\$
Roofing slate.....	72,842	71,914	67,063
School writing slate.....	31,252	34,085	31,397
Slate pencils.....	6,096	6,154	6,948
Slate of all kinds and manufactures of.....	26,211	23,068	36,877
	136,401	135,221	142,285

## Exports of Slate.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1884.....	539	6,845	1892.....	87	2,038
1885.....	346	5,274	1893.....	178	3,168
1886.....	34	495	1894.....	187	3,610
1887.....	27	373	1895.....	36	574
1888.....	22	475	1896.....	301	8,913
1889.....	26	3,303	1897 to 1907.....	Nil.	Nil.
1890.....	12	153	1908.....		2,539
1891.....	15	195	1909.....	134	612
			1910.....	Nil.	Nil.

## Imports of Slate.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	21,431	1890.....	22,871	1900.....	53,707
1881.....	22,184	1891.....	46,104	1901.....	72,187
1882.....	24,543	1892.....	50,441	1902.....	72,601
1883.....	24,968	1893.....	51,179	1903.....	84,437
1884.....	28,816	1894.....	29,267	1904.....	86,057
1885.....	28,169	1895.....	19,471	1905.....	93,228
1886.....	27,852	1896.....	24,176	1906.....	112,941
1887.....	27,845	1897.....	21,615	1907 (9 mos.).....	95,520
1888.....	23,151	1898.....	24,907	1908.....	131,069
1889.....	41,370	1899.....	33,100	1909.....	124,065
				1910.....	136,401

Mr. J. A. Dresser of the Geological Survey describes<sup>1</sup> the slate of the Eastern Townships, Province of Quebec, as follows:—

“Slate of good quality both for roofing and other purposes occurs in several places in the Ordovician and Cambrian strata adjacent to the serpentine belt.

In a number of these places quarries were opened between thirty and fifty years ago, but most of them have long since been closed from one cause or another, principally, it would appear, from an insufficient market at the time they were operated.

"At the present time these conditions have apparently changed for the better, and the slate deposits might properly receive renewed attention.

*"Ordovician Slates.*—The Ordovician slates occur in the argillaceous parts of the Farnham (lower Trenton) formation. They are dark, or bluish grey in colour, and have an excellent cleavage, nearly vertical, which may be at any angle to the bedding planes.

"These slates have been quarried at Danville, Corris, Brompton, Melbourne, and New Rockland. The last mentioned quarry is the only one at present in operation in eastern Canada. The slate produced is of excellent quality.

"The quarries at Corris, Melbourne, and New Rockland are situated so near the contact of the slates with an intrusive sheet of peridotite and serpentine as to be within the zone of alteration thus produced. The nearness to the serpentine is both a favourable and unfavourable factor. Outside of the zone of contact metamorphism the slate is soft, and lacks the strength that makes it especially valuable when slightly hardened by the intrusion; but within the contact zone, quartz veins, or flints become more numerous as the serpentine is approached, and thus tend to lessen the value of the slate. Very near the contact, too, the slate becomes a fine hornstone, too hard to be well worked; and it is then said to be sharp. The part of the rock of greatest value seems, therefore, to be near enough to the contact with the intrusive rock to secure strong slate, and far enough from it that the spaces between the flints are so large as to be worked advantageously.

"The other features that injure the slate are oblique cleavages called slants, and shattered bands known as posts. These depend on mechanical deformation, and may be connected with the intrusion of the serpentine. At the Melbourne quarry, dykes of pyroxenite strike off from the intrusive rocks for 40 feet into the slate.

"In its original composition, the rock may have largely been made up of good material for slate, except near the bottom of the slate beds where the basal conglomerate is found. Slabs taken from the lowest level at the north side of the main pit at New Rockland show pebbles of Cambrian sandstone and quartzite, and indicate that the bottom of the slate has there been reached.

"The New Rockland quarry has been operated almost continually since 1868. During the past eight years it has been worked by Messrs. Frazer and Davies under a lease from the New Rockland Slate Company. Some 35 men are employed, two steam drills, and three derricks are in operation, steam and water-power are used. Only roofing slate is now made.

"The quarrying is done in open pits, the rocks being cut down in benches. The rock is first assorted in the pit, and that suitable for splitting is hoisted and

<sup>1</sup> Summary report of the Geological Survey Branch, Department of Mines, 1910, p. 217.



sent to the splitting sheds. There, it is cut, split, and trimmed to the sizes required, or to which it is best adapted. The usual thickness is  $\frac{1}{8}$  inch, and the superficial sizes vary from 12 inches by 24 inches to 6 inches by 12 inches. While working on higher levels in a deep pit, the waste rock is allowed to accumulate to some depth in the bottom, in order to lessen the loss from breakage of good slate by falling into the pit before blasting. During winter it is an advantage to have as little of the walls exposed to the frost as possible, since the slate, once frozen, becomes valueless if it is not split when frozen. The waste rock is, therefore, removed somewhat irregularly.

*"Cambrian Slates.*—The Cambrian slates are green and reddish or purple in colour, and where there is a mingling of these colours a handsome mottled slate results. The green colour, in all cases seen, is that known as the ever or unfading green. The slates of this formation, as far as known, have not been influenced by the action of igneous rocks. They split less smoothly than the dark slates just described, having a coarser texture, and are frequently not as strong.

"The quarries that have been opened usually show large bodies of slate free from quartz veins, and sometimes having different colours in different parts of the same pit. A few buildings in the district have roofs on which these slates are said to have lain for 50 years without change of colour or serious breakage.

"Very similar slates are quarried at Fairhaven, Vermont, and are the principal variety produced in the large slate industry of that State. The manner of dressing the slate there is different from that at New Rockland, probably because of different market conditions. At New Rockland thin slates  $\frac{1}{8}$  inch are generally used, while at Fairhaven the purple, green, and mottled slates are split in thickness ranging from  $\frac{1}{4}$  inch to  $1\frac{1}{4}$  inches. The price varies with the thickness, an increase of about \$2 per square being allowed for each additional  $\frac{1}{4}$  inch. Besides being cut to proper sizes, and split to the required thickness, the slates are bored for nail or bolt holes, and the holes are counter sunk, for which an extra charge is made. These heavy slates are said to be used principally for roofing on large steel buildings of the class now being built in the larger cities.

"Slate of this quality has been opened at several places in and near this district. Green slate occurs three-fourths of a mile south of New Rockland quarry; purple and green at the Kingsey quarry, 6 miles north of Richmond, also in Brompton, southeast of Mud pond, and at other places in the Eastern Townships.

"Roofing slate is bought and sold by the square, that is sufficient slate to cover 100 square feet after allowance has been made for all overlapping. A square of slate  $\frac{1}{4}$  inch in thickness weighs upwards of 1,000 pounds; hence the thicker grades weigh a ton, or, a ton and a half per square. The present prices in New England for slate of good quality range from \$6 to \$12 per square, according to thickness. In Canada most of the slate is made into the lighter or thinner grades, for which the prices are a little below those obtained in New England."



## STONE.

Statistics of stone production given herewith include the sales of all classes of stone used for building, monumental, and ornamental purposes, stone for paving purposes, curbstone, and flagstone, rubble, rip-rap, and crushed stone, limestone for furnace, flux, sugar factories, etc., but stone used for burning lime or the manufacture of cement is not included.

The kinds of stone quarried have been classed as granite, limestone, sandstone, and marble.

The records are practically confined to quarry operations or the production of sawn or polished stone when these operations are carried on by the quarry operators. In addition to this production of stone by regular operators, there is no doubt a large stone production by individuals such as farmers and others, for house or barn foundations, concrete work, etc., of which it would be impracticable to obtain any satisfactory record. Much stone is probably also used in railway construction work and in road building, of which no record has yet been obtained.

The statistics obtained for 1909 were much more complete than those for former years, and for that reason it is somewhat difficult to make comparisons.

It is impossible, also, except in a few cases, to show the quantity of stone production, so that the value only of the shipment can be given.

The total value of the production of stone in 1910, according to returns received, was \$3,650,019, as compared with a value of \$3,127,135 in 1909; showing an increased production of \$522,884 or 16.72 per cent.

In 1908 the total value of the production was estimated at \$2,378,318. The number of active firms reporting in 1910 was 166; the total number of men employed 5,105; and total wages paid \$2,225,791. In 1909 the total number of men reported employed in connexion with stone quarrying was 4,843, and the wages paid \$2,111,987.

Of the total value of the 1910 production, limestone constituted \$2,249,576 or 61.7 per cent; granite, \$739,516 or 20.3 per cent; sandstone, \$502,148 or 13.7 per cent, and marble, \$158,779 or 4.3 per cent.

Stone was used for building purposes to the value of \$1,504,001 or 41.2 per cent of the total; monumental and ornamental stone, a value of \$147,421 or 4 per cent; curb paving and flagstone, \$239,668 or 6.6 per cent; rubble, \$352,000 or 9.7 per cent; crushed stone, \$975,379 or 26.7 per cent, and furnace flux, 896,757 tons, valued at \$431,550, or 11.8 per cent.

By provinces, Quebec shows the largest output, having a value of \$1,469,086 or 40.3 per cent of the total, being made up of limestone to the value of \$962,429 granite valued at \$356,257, and marble, \$151,000. Ontario again takes second place with a production of \$898,788, or 24.6 per cent of the total: of which limestone is credited with \$722,763; granite, \$109,678; sandstone, \$62,247, and marble, \$4,100. British Columbia ranked third in order of importance with a

total of \$422,392, including: granite, \$244,767; sandstone, \$130,825; limestone, \$43,121, and marble, \$3,679. The production in Manitoba was valued at \$331,672, made up of limestone, \$328,029, and granite, \$3,643. Alberta takes fifth place in 1910 with a total production of \$240,858, all sandstone. The Nova Scotia production was reported as \$227,635, comprising: limestone, \$192,919; granite, \$18,291, and sandstone, \$16,425. New Brunswick is credited with \$58,988, made up chiefly of sandstone and granite.

### Production of Stone by Provinces, 1910.

Province.	Granite.	Limestone.	Marble.	Sandstone.	Total.	%
	\$	\$	\$	\$	\$	
Nova Scotia.....	18,291	192,919	.....	16,425	227,635	6.2
New Brunswick.....	6,880	315	.....	51,793	58,988	1.6
Quebec.....	356,257	962,429	151,000	.....	1,469,686	40.3
Ontario.....	109,678	722,763	4,100	62,247	898,788	24.6
Manitoba.....	3,643	328,029	.....	.....	331,672	9.1
Alberta.....	.....	.....	.....	240,858	240,858	6.6
British Columbia.....	244,767	43,121	3,679	130,825	422,392	11.6
Totals.....	739,516	2,249,576	158,779	502,148	3,650,019	100.0
Per cent.....	20.3	61.7	4.3	13.7	100.0	

### Value of Stone Sold for Various Purposes in 1910.

Kind.	Building.	Ornamental and Monumental.	Paving and Curbstone.	Rubble.	Crushed.	Furnace Flux.	Total.
	\$	\$	\$	\$	\$	\$	\$
Granite.....	268,197	74,576	79,501	46,639	270,603	.....	739,516
Limestone.....	623,149	72,580	125,637	295,168	701,556	431,486	2,249,576
Marble.....	158,700	.....	.....	15	.....	64	158,779
Sandstone.....	453,955	265	34,530	10,178	3,220	.....	502,148
Totals.....	1,504,001	147,421	239,668	352,000	975,379	431,550	3,650,019

## Production of Stone by Provinces and for Purposes used, 1910.

Province.	Building.	Orna- mental and Monu- mental.	Paving and Curb- stone.	Rubble.	Crushed	Fur- nace Flux.	Total.
	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....	18,610	11,156	4,600	.....	350	192,919	227,635
New Brunswick.....	49,047	6,880	.....	2,761	200	100	58,988
Quebec.....	707,890	116,456	165,730	143,930	329,627	6,053	1,469,686
Ontario.....	83,602	9,929	65,588	135,550	414,826	189,293	898,788
Manitoba.....	215,378	.....	.....	53,302	62,992	.....	331,672
Alberta.....	234,487	.....	.....	6,371	.....	.....	240,853
British Columbia.....	194,987	3,000	3,750	10,086	167,384	43,185	422,392
Totals.....	1,504,001	147,421	239,668	352,000	975,379	431,550	3,650,019
Per cent.....	41.2	4.0	6.6	9.7	26.7	11.8	100.0

## Production of Stone by Provinces, 1909.

Province.	Granite.	Lime- stone.	Marble.	Sand- stone.	Total.	%
	\$	\$	\$	\$	\$	
Nova Scotia.....	5,832	161,922	.....	21,850	189,604	6.1
New Brunswick.....	11,541	30	.....	30,609	42,180	1.3
Quebec.....	257,096	972,253	130,000	.....	1,359,349	43.5
Ontario.....	42,700	639,674	3,441	62,824	748,639	23.9
Manitoba.....	3,345	328,554	.....	.....	331,899	10.6
Alberta.....	.....	.....	.....	90,383	90,383	2.9
British Columbia.....	134,310	37,258	25,000	168,513	365,081	11.7
Totals.....	454,824	2,139,691	158,441	374,179	3,127,135	100.0
Per cent.....	14.5	68.4	5.1	12.0	100	

## Value of Stone Sold for Various Purposes in 1909.

Kind.	Building.	Ornamental and Monu- mental.	Paving and Curb- stone.	Rubble.	Crushed.	Furnace Flux.	Total.
	\$	\$	\$	\$	\$	\$	\$
Granite.....	159,470	73,611	106,963	63,205	51,575	.....	454,824
Limestone.....	666,324	95,457	154,490	210,418	609,349	403,613	2,139,691
Marble.....	20,000	135,780	.....	2,661	.....	.....	158,441
Sandstone.....	324,716	1,490	17,774	26,836	3,363	.....	374,179
Totals.....	1,170,550	306,338	279,227	303,120	664,287	403,613	3,127,135

## Production of Stone by Provinces and for Purposes used, 1909.

Province.	Building.	Orna- mental and Monu- mental.	Paving and Curb- stone.	Rubble.	Crushed.	Furnace Flux.	Total.
	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....	16,043	4,018	2,846	6,000	800	159,897	189,604
New Brunswick.....	29,192	7,038	450	5,500	.....	.....	42,180
Quebec.....	554,722	230,095	210,426	94,241	259,615	10,250	1,359,349
Ontario.....	99,200	12,687	54,443	82,449	303,652	196,208	748,639
Manitoba.....	179,605	45,000	62	49,312	57,920	.....	331,899
Alberta.....	87,450	.....	.....	2,933	.....	.....	90,383
British Columbia.....	204,338	7,500	11,000	62,685	42,300	37,258	365,081
Totals.....	1,170,550	306,338	279,227	303,120	664,287	403,613	3,127,135
Per cent.....	37.4	9.8	8.9	9.7	21.3	12.9	100.

*Exports and Imports.*—The exports of stone are classified simply as wrought and unwrought; the total value of the exports in 1910 was \$27,471 as compared with \$59,370 in 1909 and \$58,005 in 1908.

The annual exports since 1890 are shown in the following table:—

## Exports of Stone and Marble, Wrought and Unwrought.

Calendar Year.	Wrought.	Unwrought.	Calendar Year.	Wrought.	Unwrought.
	\$	\$		\$	\$
1890.....	21,725	43,611	1900.....	5,933	115,711
1891.....	13,398	46,162	1901.....	5,917	157,739
1892.....	7,698	47,424	1902.....	8,632	124,829
1893.....	9,102	12,532	1903.....	7,684	46,295
1894.....	22,576	34,130	1904.....	4,760	17,802
1895.....	8,587	51,616	1905.....	3,545	13,089
1896.....	4,934	32,897	1906.....	23,097	4,675
1897.....	9,415	42,034	1907.....	4,233	3,087
1898.....	2,526	65,370	1908.....	15,194	42,811
1899.....	5,092	101,931	1909.....	33,598	25,772
			1910.....	5,352	22,119

The imports are classified as building stone of all kinds, except marble, manufactures of granite and other stone, and marble and its manufactures. The total value of the imports of stone during the calendar year 1910 was \$845,123, as compared with a value in 1909 of \$683,801; showing an increase of \$161,322, or 23.6 per cent. Of the total imports during 1910, \$311,595 in value was classed as building stone, and \$192,213 as granite sawn and manufactures of; \$74,100 as paving blocks, and \$267,215 as marble and manufactures of.

During 1909 the imports of building stone were \$280,557; granite, \$162,742; paving blocks, \$58,355, and marble, \$182,147.

The imports during both years were derived chiefly from the United States—21



States and Great Britain; the United States supplying building stone, paving blocks, and marble principally. The imports from Great Britain consisted mainly of manufactures of granite. Marble is obtained in some quantity also from Italy and other countries. The total value of the imports from the United States in 1910 was \$640,084; from Great Britain, \$160,664; from Italy, \$31,314 and from other countries, \$13,061.

### Total Imports of Stone during the Calendar Years 1909 and 1910.

Imports.	1909.		1910.	
	Tons.	Value.	Tons.	Value.
		\$		\$
Building stone, rough (1).....	21,746	102,470	27,658	125,531
“ dressed (2).....	35,910	178,087	33,996	186,064
Granite, sawn only.....	307	2,380	789	3,287
“ manufactures of.....		129,918		154,798
Paving blocks.....		58,355		74,100
Manufactures of stone, N.O.P.....		30,444		34,128
Marble and manufactures of—				
Marble, sawn or sand rubbed, not polished.....		118,095		154,153
“ rough, not hammered or chiselled.....		8,414		18,368
“ manufactures of, N.O.P.....		55,638		94,694
		683,801		845,123

(1) Flagstones, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.

(2) Flagstone; all other building stone, sawn or dressed.

### Imports of Stone, showing Country of Origin, Calendar Year 1910.

Imports.	Great Britain.		United States.		Italy.	Other Countries.
	Tons.	Value.	Tons.	Value.	Value.	Value.
		\$		\$	\$	\$
Building stone, rough (1).....	265	1,810	26,951	122,531		*1,190
“ dressed (2).....	42	153	33,954	185,911		
Granite, sawn only.....	7	37	782	3,250		
“ manufactures of.....		149,958		4,762		78
Paving blocks.....		0		73,033		1,067
Manufactures of stone, N.O.P.....		4,340		27,548		2,240
Marble and manufactures of—						
Marble, sawn or sand rubbed, not polished.....		299		122,168		372
“ rough, not hammered or chiselled.....				12,939	31,314	5,429
“ manufactures of, N.O.P.....		4,067		87,942		2,685
		160,664		640,084	31,314	13,061

(1) Flagstones, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.

(2) Flagstone; all other building stone, sawn or dressed.

(\*) Represents value of 442 tons.



## Imports of Stone, Fiscal Years 1909 and 1910.

Imports.	1909.		1910.	
	Tons.	Value.	Tons.	Value.
Building stone, rough (1).....	14,011	\$ 63,984	23,928	\$ 110,997
“ dressed (2).....	16,841	72,961	36,884	184,620
Granite, sawn only.....	302	2,756	280	2,146
“ manufactures of.....		123,155		130,697
Paving blocks.....		42,420		58,247
Manufactures of stone, N.O.P.....		25,618		32,372
Marble and manufactures of—				
Marble, sawn or sand rubbed, not polished.....		108,522		128,897
“ rough, not hammered or chiselled.....		9,138		1,398
“ manufactures of, N.O.P.....		83,268		54,503
		531,822		703,877

(1) Flagstones, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.

(2) Flagstone; all other building stone, sawn or dressed.

## Annual Imports of Stone.

Fiscal Year.	BUILDING STONE.		Manufac- tures of Granite, etc.	Marble.	Flagstones.	Total Value
	Rough.	Dressed.				
	\$	\$	\$	\$	\$	\$
1880.....	32,824	3,146	29,408	63,015		128,393
1881.....	7,823	50,326	36,877	85,977	241	181,244
1882.....	32,848	775	37,267	109,505	848	181,243
1883.....	33,429	1,632	45,631	128,520	99	209,316
1884.....	46,232	4,856	45,290	108,771	1,158	206,307
1885.....	28,433	2,058	39,867	102,835	1,756	174,949
1886.....	36,776	4,899	41,984	117,752	9,443	210,854
1887.....	47,819	6,549	41,829	104,250	10,966	211,413
1888.....	84,263	2,110	47,487	94,681	21,077	249,618
1889.....	89,723	10,591	61,341	118,421	15,451	295,527
1890.....	126,456	5,699	84,396	99,353	48,995	364,899
1891.....	151,119	19,771	61,051	107,661	36,348	372,950
1892.....	85,169	10,381	39,479	106,268	15,048	256,345
1893.....	47,609	8,901	49,323	96,177	8,500	210,510
1894.....	48,097	4,811	49,510	94,657	2,429	199,504
1895.....	37,732	6,550	51,050	83,422	84	178,838
1896.....	42,737	11,393	51,499	90,065	Nil	195,694
1897.....	27,442	11,272	34,026	77,150	227	150,117
1898.....	25,322	3,173	41,240	95,894	1,540	167,129
1899.....	43,494	4,546	60,148	104,879	Nil	210,067
1900.....	63,376	1,157	57,039	94,017	63	215,652
1901.....	45,039	1,039	66,639	96,159	116	208,992
1902.....	69,972	29,102	72,397	130,424	1,231	303,126
1903.....	71,202	16,664	78,629	153,481	Nil	319,976
1904.....	59,864	33,914	141,165	181,511	Nil	416,454
1905.....	49,004	53,813	150,160	145,466	Nil	398,443
1906.....	66,994	65,134	178,435	189,589	Nil	500,152
1907.....	58,398	78,967	136,779	176,450	Nil	450,594
1908.....	80,950	90,740	192,248	237,587	Nil	651,525
1909.....	63,984	72,961	1 3,949	200,923	Nil	531,822
1910.....	110,997	184,620	223,462	184,798	Nil	703,877

## GRANITE.

The production of granite and trap-rock in 1910, according to returns from 33 active firms reporting, was valued at \$739,516; as compared with a production by 29 firms valued at \$454,824 in 1909; showing an increase of \$284,692, or 63 per cent.

There was an increased production of granite for building, monumental, and ornamental purposes, a very large increase in the production of crushed granite, and a falling off in values of granite sold for curbing, paving, and rubble.

Quebec province was the largest producer, the value of sales in 1910 being \$356,257, as compared with \$257,096 in 1909. The value of sales in British Columbia in 1910 was \$244,767, as compared with \$134,310 in 1909; while Ontario produced a value of \$109,678 in 1910, as compared with \$42,700 in 1909.

New Brunswick was at one time a large producer of granite, the quarries in the vicinity of St. George being extensively operated. There is still a considerable industry at St. George, although much less than formerly, in the manufacture of granite, the total value of the dressed stone produced in 1910 being \$70,000. The rough stone, however, is now obtained largely from other quarries including Spoon island, N.B., Redbeach, Maine, and Mt. Johnston, Que.

Statistics of the production by provinces for 1910 and 1909, showing the purposes for which the stone was sold and the annual total production since 1886, are shown in the following tables:—

Value of Granite Production by Provinces, 1909.

Province.	Building.	Monumental or Ornamental	Curb, or Paving.	Rubble.	Crushed.	Total.
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	458	2,528	2,846	.....	.....	5,832
New Brunswick.....	3,378	7,038	450	675	.....	11,541
Quebec.....	139,634	58,845	56,167	20	2,430	257,096
Ontario.....	.....	2,700	36,500	.....	3,500	42,700
Manitoba.....	.....	.....	.....	.....	3,345	3,345
British Columbia.....	16,000	2,500	11,000	62,510	44,300	134 310
Total.....	159,470	73,611	106,963	63,205	51,575	454,824

## Value of Granite Production by Provinces, 1910.

Province.	Building.	Monumental or Ornamental	Curb, or Paving.	Rubble.	Crushed.	Total.
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	2,600	11,091	4,600			18,291
New Brunswick.....		6,880				6,880
Quebec.....	202,435	53,405	40,831	3,055	56,531	356,257
Ontario.....	1,100	200	30,320	33,513	44,545	109,678
Manitoba.....					3,643	3,643
British Columbia.....	62,062	3,000	3,750	10,071	165,884	244,767
Total.....	268,197	74,576	79,501	46,639	270,603	739,516

## Annual Production of Granite.

Calendar Year.	Tons.	Value.	Calendar Year	Tons.	Value.
		\$			\$
1886.....	6,062	63,309	1898.....	23,897	81,073
1887.....	21,217	142,506	1899.....	13,418	90,542
1888.....	21,352	147,305	1900.....		80,000
1889.....	10,197	79,624	1901.....		155,000
1890.....	13,307	65,985	1902.....		210,000
1891.....	13,637	70,056	1903.....		200,000
1892.....	24,302	89,326	1904.....		150,000
1893.....	22,521	94,393	1905.....		226,305
1894.....	16,392	109,936	1906.....		278,419
1895.....	19,238	84,838	1907.....	15,136	194,712
1896.....	18,717	106,709	1908.....		282,320
1897.....	19,345	61,934	1909.....		454,824
			1910.....		739,516

## LIMESTONE.

The statistics given herewith do not include the value of the stone burned into lime by the quarry operators nor that of the stone used in the manufacture of cement, a record of lime and cement production being separately given. With these exceptions the total value of the production of limestone in Canada in 1910 was \$2,249,576, as compared with a value of \$2,139,691 in 1909, or an increase of about 5 per cent.

There was a decrease in the production of limestone for building and ornamental purposes and for curbstone and paving, but an increased production of crushed stone, rubble, and furnace flux.

The production during 1910 of limestone for building purposes was valued at \$695,729, as against \$761,821 in 1909; the value of crushed stone in 1910 was \$701,556, as against \$609,349 in the previous year. Curbstone and paving blocks were produced to the value of \$125,637 in 1910, as compared with \$154,490 in

1909. The value of rubble in 1910 was \$295,168, as against \$210,418 in 1909. The production of furnace flux in 1910 was 896,677 tons, valued at \$431,486, as compared with 842,232 tons, valued at \$403,613, in 1909.

There is no separate record of the production of limestone in 1908 or previous years.

### Value of Limestone Production by Provinces, 1909.

Province.	Building and Ornamental.	Crushed.	Curbstone and Paving.	Rubble.	Furnace Flux.		Total.
					Tons.	\$	
Nova Scotia.....	2,025				319,795	159,897	161,922
New Brunswick.....	30						30
Quebec.....	456,338	257,185	154,259	94,221	20,500	10,250	972,253
Ontario.....	78,823	297,589	169	66,885	427,422	196,208	639,674
Manitoba.....	224,605	54,575	62	49,312			328,554
British Columbia.....					74,515	37,258	37,258
Total.....	761,821	609,349	154,490	210,418	842,232	403,613	2,139,691

### Value of Limestone Production by Provinces, 1910.

Province.	Building and Ornamental.	Crushed.	Curbstone and Paving.	Rubble.	Furnace Flux.		Total.
					Tons.	\$	
Nova Scotia.....					385,838	192,919	192,919
New Brunswick.....	15	200			100	100	315
Quebec.....	417,506	273,096	124,899	140,875	9,573	6,053	962,429
Ontario.....	62,830	368,911	738	100,991	406,394	189,293	722,763
Manitoba.....	215,378	59,349		53,302			328,029
British Columbia.....					94,772	43,121	43,121
Total.....	695,729	701,556	125,637	295,168	896,677	431,486	2,249,576

The Province of Quebec was the largest producer of limestone, having a total output valued at \$962,429: of which \$417,506 was building and ornamental stone; \$273,096 crushed stone; \$140,875 in rubble; \$124,899 curbstone and paving, and \$6,053 furnace flux.

The production of all classes was slightly less than that reported for 1909. The record is probably an underestimation as there are one or two large firms that neglected to make returns, while there is a class of small operators from whom it is particularly difficult to obtain satisfactory information. In many cases they do not seem to have kept any record of their shipments. Ontario shows an increased production of limestone, the value of output in 1910 being \$722,763: of which \$368,911 was crushed stone; \$189,293 flux; \$100,991 rubble, and \$62,830 building stone. The production in Manitoba was valued at \$328,029, and con-



sists chiefly of building stone with some crushed stone and rubble. The production of limestone in Nova Scotia and British Columbia was used entirely for furnace flux.

### MARBLE.

From 1886 to 1896 there was a small production of marble, aggregating, however, only \$4,167 in value for the eleven years. During the next eleven years—1897 to 1907—there is no record of any production. But the opening up of the quarries at Philipsburg, Que., by the Missisquoi Marble Company, Limited., together with the development of quarries in Ontario and British Columbia, has resulted in a considerable production of marble during the past three years. The total value of the production in 1910 was returned as \$158,779, as compared with \$158,441 in 1909 and \$125,000 in 1908. As already shown in a previous table the imports of marble during 1910 were valued at \$267,215, and in 1909, \$182,147. Marble quarries were operated during 1910 at Philipsburg, Que., Darling and Hungerford townships in Ontario, and Marblehead, British Columbia.

The value of the Quebec production was \$151,000, as compared with \$130,000 in 1909; Ontario \$4,100 as against \$3,441 in 1909; and British Columbia \$3,679 as compared with \$25,000 in 1909. With the exception of the Philipsburg quarries the operations were practically confined to the development of quarries.

#### Annual Production of Marble.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	501	9,900	1893.....	590	5,100
1887.....	242	6,224	1894.....	Nil	Nil
1888.....	191	3,100	1895.....	200	2,000
1889.....	3	980	1896.....	224	2,405
1890.....	780	10,776	1897 to 1907 inclusive.....	Nil	Nil
1891.....	240	1,752	1908.....		125,000
1892.....	340	3,600	1909.....		158,441
			1910.....		158,779

### SANDSTONE.

There was a considerable increase in the production of sandstone in 1910, the value of output being \$502,148, as compared with \$374,179 in 1909. The greater part of the sandstone quarried is used for building purposes. A small quantity is used as rubble and as crushed stone, while in Ontario sandstone paving blocks are made.

Of the production in 1910 building and ornamental sandstone was sold to the value of \$454,220, or 90.5 per cent of the total sandstone sales. This amount comprised \$118,364 in value of rough stone and \$335,856 in dressed stone as sold by the quarry operators. The production in 1909 of building and



ornamental stone was valued at \$326,206, comprising \$103,859 in rough stone and \$222,347 in dressed stone.

Statistics of production in 1909 and 1910 are shown in the next two tables. There is no complete record of the sandstone production throughout Canada in previous years.

### Value of Sandstone Production by Provinces, 1910.

Province.	Building and Orna- mental.	Crushed.	Paving.	Rubble.	Total.
	\$	\$	\$	\$	\$
Nova Scotia.....	16,075	350	.....	.....	16,425
New Brunswick.....	49,032	.....	.....	2,761	51,793
Ontario.....	25,301	1,370	34,530	1,046	62,247
Alberta.....	234,487	.....	.....	6,371	240,858
British Columbia.....	129,325	1,500	.....	.....	130,825
Total.....	454,220	3,220	34,530	10,178	502,148

### Value of Sandstone Production by Provinces, 1909.

Province.	Building and Orna- mental.	Crushed.	Paving.	Rubble.	Total.
	\$	\$	\$	\$	\$
Nova Scotia.....	15,050	800	.....	6,000	21,850
New Brunswick.....	25,784	.....	.....	4,825	30,609
Ontario.....	29,584	2,563	17,774	12,903	62,824
Alberta.....	87,450	.....	.....	2,933	90,383
British Columbia.....	168,338	.....	.....	175	168,513
Total.....	326,206	3,363	17,774	6,836	374,179





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CANADA

DEPARTMENT OF MINES

MINES BRANCH

HON. W. J. ROCHE, MINISTER; A. P. LOW, LL.D., DEPUTY MINISTER;  
EUGENE HAANEL, PH.D., DIRECTOR.

## ANNUAL REPORT

ON THE

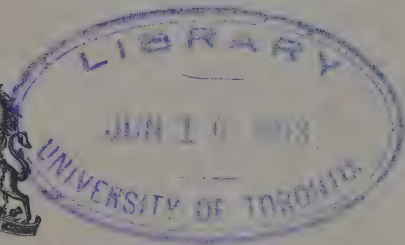
# MINERAL PRODUCTION OF CANADA

During the Calendar Year

1911

JOHN McLEISH, B.A.

*Chief of the Division of Mineral Resources and Statistics*



No. 201.

OTTAWA  
GOVERNMENT PRINTING BUREAU  
1913





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## LETTER OF TRANSMITTAL.

Dr. EUGENE HAANEL,  
Director of Mines,  
Department of Mines, Ottawa.

SIR,—I beg to hand you herewith, the Annual Report on the Mineral Production of Canada, giving revised statistical information descriptive of the mining and metallurgical production in Canada during the calendar year, 1911.

A preliminary report on the mineral production during 1911 was sent to press February 27, 1912, and issued within the following week.

Parts of the present report—including a “General Summary of the Mineral Production in Canada during 1911,” “Report on the Production of Iron and Steel in Canada during 1911,” “Report on the Production of Copper, Gold, Lead, Nickel, Silver, Zinc, and Other Metals in Canada during 1911,” “Report on the Production of Coal and Coke in Canada during 1911,” and “Report on the Production of Cement, Lime, Clay Products, Stone, and Other Structural Materials in Canada during 1911”—have already been published as separate bulletins.

In the preparation of this report Mr. Cosmo T. Cartwright has again devoted special attention to the metalliferous subjects, having prepared the special chapters on gold, silver, copper, lead, nickel, zinc, and miscellaneous metallic minerals, and Mr. J. Casey has given particular care to the compilation of the statistics.

Free use has been made of the reports published by the Provincial Bureaus of Mines; and grateful acknowledgment is made of the hearty co-operation of mine and smelter operators who have, with few exceptions, cheerfully complied with our requests, and furnished the department with statistics and information regarding their operations.

I have the honour to be, Sir,

Your obedient servant,

(Signed) John McLeish.

Division of Mineral Resources and Statistics,  
October 15, 1912.



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## EXPLANATORY NOTES.

The term 'ton' used throughout this report signifies a ton of 2,000 pounds; while the year referred to means calendar year, unless otherwise stated. The government fiscal year formerly ended on the 30th of June; but now terminates on the 31st of March. This change took place in 1907, hence the fiscal period ending March 31, 1907, covers only nine months.

Statistics of exports and imports given throughout this report are compiled from the reports of Trade and Navigation published by the Customs Department.

The term 'production' used throughout this report may in general be interpreted as meaning the quantity sold or shipped. Mineral products mined or manufactured, but not sold or shipped, at the end of the year, are not included as 'production.' An exception to this usage will be found in reference to pig iron, in which case the statistics of production represent the quantities made.

The value of the metallic minerals produced, whether refined in Canada or not, is calculated on the basis of the average price of the metal in some recognized market. New York prices have usually been taken as the standard. In the case of lead, however, the New York price is so much higher than that of London, that the Montreal price—about midway between these two—is now used. The value of non-metallic products is given as at the mine or point of shipment.



# THE MINERAL PRODUCTION OF CANADA

During the Calendar Year

1911

## General Summary.

The total value of the mineral production in Canada in 1911, according to revised statistics now complete, was \$103,220,994, which although less than the production of 1910 by \$3,602,629 was nevertheless much greater than the output of any other previous year. The total value of the production in 1910 was \$106,823,623, the decrease in 1911 being equivalent to a little over 3 per cent. The largest production per capita was made in 1910 when the output averaged \$14.93 per head of population; the year 1911 was next with an average output per capita of \$14.42.

The year 1886 was the first year for which complete statistics of mineral production for the whole of Canada were collected by this Department, and the production that year was reported as \$10,221,255, or about \$2.23 per capita. In ten years the production had increased over 100 per cent, to \$22,474,256, or \$4.38 per capita, in 1896. At this time, the Yukon began to contribute largely to the gold production, and, during the next five years, an increase of nearly 200 per cent is shown, the total reaching a value of \$65,797,911, or \$12.16 per capita in 1901. The next three years witnessed a slight falling off; but from 1904 the production again rapidly increased to its present high record due to the general development of a wide variety of mineral products.

## Annual Mineral Production in Canada since 1886.

Year.	Value of production.	Value per capita.	Year.	Value of production.	Value per capita.
	\$	\$ cts.		\$	\$ cts.
1886.....	10,221,255	2 23	1899.....	49,234,005	9 27
1887.....	10,321,331	2 23	1900.....	64,420,877	12 04
1888.....	12,518,894	2 67	1901.....	65,797,911	12 16
1889.....	14,013,113	2 96	1902.....	63,231,836	11 36
1890.....	16,763,353	3 50	1903.....	61,740,513	10 83
1891.....	18,976,616	3 92	1904.....	60,082,771	10 27
1892.....	16,623,415	3 39	1905.....	69,078,999	11 49
1893.....	20,035,082	4 04	1906.....	79,286,697	12 81
1894.....	19,931,158	3 98	1907.....	86,865,202	13 75
1895.....	20,505,917	4 05	1908.....	85,557,101	13 16
1896.....	22,474,256	4 38	1909.....	91,831,441	13 70
1897.....	28,485,023	5 49	1910.....	106,823,623	14 93
1898.....	38,412,431	7 32	1911.....	103,220,994	14 42

## Comparative Statement of Mineral Production for Years 1910 and 1911.

Product.	1910.			1911.			Increase (+) or Decrease (-),		Increase (+) or Decrease (-),	
	Quantity.	Value. (a)	Per cent of total.	Quantity.	Value. (a)	Per cent of total.	Quantity.	%	Value.	%
<i>Metallic.</i>										
Antimony ore.....	364	13,906	.....	0	0	.....	.....	.....	13,906	.....
Cobalt (i).....	.....	51,986	.....	154,174	.....	.....	.....	.....	51,986	.....
Cobalt oxide and nickel oxide.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cobalt material, mixed cobalt and nickel oxides.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Copper (b).....	55,692,369	7,094,094	6.64	1,260,832	221,690	0.22	.....	.....	221,690	.....
Gold.....	493,707	10,295,835	9.55	55,648,011	6,886,998	6.67	.....	.....	207,096	2.92
Pig iron from Canadian ore (c).....	104,306	1,630,849	1.54	478,159	9,781,977	9.48	.....	.....	424,758	4.16
Iron ore sold for export (k).....	114,449	324,186	0.30	42,186	613,404	0.59	.....	.....	1,037,445	62.84
Lead (d).....	32,987,508	1,216,249	1.13	40,137	88,570	0.09	.....	.....	235,616	72.68
Nickel (e).....	37,271,033	11,181,310	10.46	23,784,969	827,717	0.80	.....	.....	388,532	31.95
Silver (f).....	32,869,264	17,580,455	16.45	34,098,744	10,229,623	9.91	.....	.....	951,687	8.51
Zinc ore.....	5,063	120,003	0.11	32,559,044	17,355,272	16.81	.....	.....	225,183	1.28
Total.....	.....	49,438,873	46.28	2,590	101,072	0.10	.....	.....	18,931	15.78
<i>Non-Metallic.</i>										
Actinolite.....	30	330	.....	67	736	.....	.....	.....	406	123.00
Arsenious oxide.....	2,049	(j) 81,044	.....	2,097	76,237	.....	.....	.....	4,807	5.93
Asbestos.....	77,508	2,555,974	2.39	101,393	2,922,062	2.83	.....	.....	366,088	14.32
Asbestic.....	24,707	17,629	.....	26,021	21,046	.....	.....	.....	3,417	19.38
Chromite.....	299	3,734	.....	157	2,587	.....	.....	.....	1,147	30.72
Coal.....	12,909,152	30,909,779	28.93	11,323,388	26,467,646	25.64	.....	.....	4,442,133	13.50
Corundum.....	1,870	198,680	0.18	1,472	161,873	0.15	.....	.....	36,807	18.53
Feldspar.....	15,809	47,667	.....	17,723	51,939	.....	.....	.....	4,272	8.96
Fluorspar.....	2	15	.....	34	238	.....	.....	.....	223	.....
Graphite.....	1,392	74,087	.....	1,269	69,576	.....	.....	.....	4,511	6.09
" artificial.....	1,221	.....	.....	1,086	.....	.....	.....	.....	.....	.....
Grindstones.....	3,973	47,196	.....	4,566	52,942	.....	.....	.....	5,746	12.17
Gypsum.....	525,246	934,446	0.87	518,383	993,394	0.96	.....	.....	58,948	6.31
Magnetite.....	323	2,160	.....	991	5,531	.....	.....	.....	3,371	156.00
Manganese.....	.....	190,385	0.17	5 1/2	300	.....	.....	.....	300	.....
Mica.....	.....	.....	.....	.....	128,677	0.12	.....	.....	61,708	32.41



Mineral pigments —	Tons.	0	0	50	400	+	50	+	400	.....	50	.....	400	.....	+	50	.....	400	.....
Barytes .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ochres .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mineral water .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Natural gas (g).....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Peat .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Petroleum (h).....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Phosphate.....	Tons.	841	315,895	1,463	3,817	.....	622	.....	1,213	.....	24,803	.....	357,073	.....	.....	.....	.....	.....	.....
Pyrites.....	Bis.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pyrites.....	Tons.	1,478	53,870	82,666	5,206	.....	857	.....	7,372	.....	28,796	.....	365,820	.....	.....	.....	.....	.....	.....
Quartz.....	.....	88,205	84,092	60,526	83,865	.....	27,679	.....	8,086	.....	7,490	.....	443,004	.....	.....	.....	.....	.....	.....
Salt .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Talc .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tripolite.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	.....	.....	37,757,158	35,34	.....	.....	.....	.....	33,33	.....	.....	.....	34,405,960	.....	.....	.....	.....	.....	.....

\* Short tons throughout. (a) The metals copper, lead, nickel, and silver are for statistical and comparative purposes valued at the final average value of the refined metal. Pig iron, zinc ore, and cobalt oxides are valued at the furnace or spot, and non-metallic products at the mine or point of shipment. (b) Copper content of smelter products and estimated recoveries from ores exported, at 12.376 cents per pound, in 1911; and 12.738 cents per pound in 1910. (c) The total production of pig iron in Canada in 1911 was 917,535 tons valued at \$12,307,125, of which it is estimated 875,349 tons valued at \$11,693,721 should be credited to imported ores; in 1910, the total production was 800,797 tons valued at \$11,245,622, of which 685,891 tons valued at \$9,594,773 are credited to imported ores. (d) Refined lead and lead contained in base bullion exported at 30 cents in 1910 and 1911. (Increasing quantities of nickel-copper matte are now being used in making monel metal which is sold at a price much below that of refined nickel.) The value of the nickel contained in matte, as returned by the operators, was about 10 cents per pound for both years. (e) Estimated recoverable silver at 63.304 cents per ounce in 1911, and at 53.486 cents in 1910. (f) Gross returns for sale of gas, for cobalt content. Cobalt not paid for in 1911. (g) Quantity on which bounty was paid and valued at \$1.22½ per barrel in 1911 and at \$1.23 in 1910. (h) Value received in 1910 by shippers of silver cobalt; ores which differ slightly from those of the Trade and Navigation reports. (i) In 1910 includes 547 tons arsenical ore valued at \$5,716. (k) In 1911, figures as reported by the producers.



The production of metalliferous products in 1911 was valued at \$46,105,423, being 44.67 per cent of the total mineral output and a decrease in value from the previous year of \$3,333,450, or about 6½ per cent. The value of the production of non-metalliferous products (excluding structural material and clays) in 1911 was \$34,405,960, being 33.33 per cent of the total mineral output and a decrease of \$3,351,198, or 8.8 per cent from the value of the production in 1910. The value of the production of clay, lime and stone, and other structural materials in 1911 was \$22,709,611, or 22 per cent of the total production; and an increase of \$3,082,019, or 13.5 per cent, over the 1910 output.

The most important product in point of value was coal which contributed over 25½ per cent of the total production; silver, next in importance, contributed over 16½ per cent, nickel nearly 10 per cent; gold almost 9½ per cent; clay products 8 per cent; cement 7½ per cent; copper 6½ per cent.

The falling off in production in 1911, while apparently quite general among the metals, is to be ascribed in large part to the long continued strike of coal miners in the Province of Alberta and the Crowsnest district of British Columbia. The scarcity of coal and coke in these Provinces seriously interfered with the smelting industry of British Columbia and undoubtedly resulted in a smaller production of copper, silver, and gold than would otherwise have been made. In the case of iron, while a decrease is shown in the quantity of pig iron attributable to Canadian ore, the total production of pig iron from domestic and imported ores showed a very large increase over the 1910 output.

The prices of metals upon which the value of the production directly depends did not vary greatly during the year, in fact the averages have been fairly stationary during the past three years. The prices of copper, lead, and silver on the New York market were fractionally lower in 1911. Spelter was fractionally higher and nickel showed no change. On the London market and in Montreal which follows London, lead showed an increased average price.

	1907.	1908.	1909.	1910.	1911.
	Cts.	Cts.	Cts.	Cts.	Cts.
Copper, New York.....	20·004	13·208	12·982	12·738	12·376
Lead ".....	5·325	4·200	4·273	4·446	4·420
" London.....	4·143	2·935	2·839	2·807	3·035
" Montreal*.....	4·701	3·364	3·268	3·246	3·480
Nickel, New York.....	45·000	43·000	40·000	40·000	40·000
Silver ".....	65·327	52·864	51·503	53·486	53·304
Spelter ".....	5·962	4·720	5·503	5·520	5·758
Tin ".....	38·166	29·465	29·725	34·123	42·281

\*Quotations furnished by Messrs. Thomas Robertson & Company, Montreal, Que.

Amongst the non-metallic products the most serious falling off was in coal, due as already intimated to labour difficulties; smaller decreases are shown in

corundum, mica, and petroleum, while on the other hand substantial increases were made in the sales of asbestos, gypsum, natural gas, pyrites, and salt. The structural materials and clay products nearly all show an increased production.

## EXPORTS AND IMPORTS.

A very large portion of the mineral production of Canada is exported for consumption or refining outside of Canada. On the other hand considerable quantities of mine products, chiefly those which have been refined or subjected to partial treatment or in the form of manufactured goods ready for consumption, are imported.

The total value of the exports of products of the mine, including direct mine products and manufactures thereof in 1911, was \$52,546,593, as compared with \$51,856,862 in 1910. This value includes for 1911 mine products to the value of \$41,121,688 and manufactures valued at \$11,424,905. Practically the whole of the Canadian production of copper, nickel, and silver is exported, also a very large proportion of the production of gold, asbestos, and mica. There are also considerable exports of coal. These items alone contribute about 74.4 per cent of the value of the mine products exported. Manufactures of mine products exported consist chiefly of iron and steel goods, aluminium, calcium carbide, lime, acetate of lime, and coke.

The United States is the chief destination of Canada's mine exports, about 77.4 per cent having been exported to that country during the fiscal year 1910-1911, and about 15.7 per cent to Great Britain.

A great variety of mineral products, chiefly in a manufactured or semi-manufactured condition, are annually imported into Canada. The total value of these imports during the calendar year 1911 was \$181,839,077, as compared with imports valued at \$147,305,012 in 1910. Of the total imports in 1911, nearly \$48,000,000 in value consisted of the cruder forms of mineral products such as coal, ores of metals, diamonds unset and bort, asphaltum, alumina, clays, etc., whilst iron and steel and manufactures thereof were imported to the value of over \$93,000,000. Imports of the metals copper, gold, silver, lead, platinum, tin, and zinc, and manufactures thereof, reached a total value of over \$18,750,000, and imports of petroleum and clay products exceeded \$11,000,000 in value.

The great excess of imports over exports would seem to indicate the existence of large opportunities for the development not only of Canada's mineral production but also of many manufacturing industries which utilize mine products as raw materials. The fact, however, must not be overlooked that the geographical situation of Canada and the United States, separated by an imaginary barrier 3,000 miles in length, evidently results, notwithstanding the tariffs on both sides, in a mutually advantageous interchange of trade. Then we find large exports as well as imports of coal and of agricultural implements. The continued large export of crude unrefined ores and metal products and the cor-



responding imports of refined and manufactured metal products still point to opportunities for the development of metallurgical industries as well as industries for the treatment, refinement, and manufacture of non-metallic products.

### Exports of the Products of the Mine and of Manufactures of Mine Products— Calendar Years 1910 and 1911.

		1910.		1911.	
		Quantity.	Value.	Quantity.	Value.
MINE PRODUCTS.			\$		\$
Arsenic.....	Lbs.	4,512,673	173,932	4,125,558	81,761
Asbestos.....	Tons.	71,485	2,108,632	75,120	2,067,259
Barytes.....	Cwt.	5	150		
Chromite.....	Tons.	15	150		
Coal.....	"	2,377,049	6,077,350	1,500,639	4,357,074
Copper, fine in ore, etc.....	Lbs.	56,964,127	5,840,553	55,208,054	5,459,770
" black or coarse and in pigs.....				79,656	7,955
Feldspar.....	Tons.	15,601	47,962	16,150	56,085
Gold.....			5,491,051		7,493,523
Gypsum.....	Tons.	346,081	416,725	362,102	425,161
Lead, in ore, etc.....	Lbs.	46,800	1,308	65,100	1,826
" in pig, etc.....		7,712,253	248,174	71,961	2,806
Mica.....	"	937,263	330,903	693,940	242,548
Mineral pigments.....		3,491,737	29,839	3,999,925	27,070
Mineral water.....	Gals.	16,136	7,169	26,495	12,952
Nickel, in ore, etc.....	Lbs.	36,014,782	4,039,040	32,619,971	3,676,396
Oil, refined.....	Gals.	2,818	462	489	73
Ores—					
Antimony.....	Tons.	239	14,095	57	4,946
Corundum.....	"			742	77,777
Iron.....	"	114,499	324,186	37,686	133,411
Manganese.....	"	4	160	4	225
Other ores.....	"	9,534	641,426	6,919	375,695
Phosphates.....	"			3	100
Platinum.....	Ozs.	2,254	62,776	39	1,961
Plumbago.....	Cwt.	15,768	53,008	16,263	43,249
Pyrites.....	Tons.	30,434	110,071	32,102	120,585
Salt.....	Lbs.	275,200	2,618	454,600	5,055
Sand and gravel.....	Tons.	624,824	407,974	573,494	408,110
Silver.....	Ozs.	30,699,770	15,649,537	31,216,725	15,807,366
Stone, building.....	Tons.	63,407	18,867	83,767	25,103
" ornamental.....	"	446	3,352	168	1,796
" for manufacture of grindstones.....	"	308	338	15	22
Other products of the mine.....			134,462		204,028
Total mine products.....			42,236,270		41,121,688
MANUFACTURES.					
Acetate of lime.....	Lbs.			7,428,157	117,904
Agricultural implements—					
Cultivators.....	No.			5,923	138,377
Harrow.....	"	8,924	115,068	5,412	95,904
Harvesters.....	"	11,382	1,234,794	14,355	1,432,911
Hay rakes.....	"	6,344	205,342	11,085	317,842
Mowing machines.....	"	18,745	634,326	22,859	778,274
Parts of.....			575,848		796,246
Ploughs.....	No.	16,888	540,677	20,437	508,095



**Exports of the Products of the Mine and of Manufactures of Mine Products—  
Calendar Years 1910 and 1911—Continued.**

		1910.		1911.	
		Quantity.	Value.	Quantity.	Value.
MANUFACTURES.—Continued.			\$		\$
Reapers.....	No.	3,411	220,517	9,385	574,315
Seeders.....	"	256	13,727	174	13,795
Threshing machines.....	"	29	8,576	339	92,442
All other.....	"		1,163,722		1,533,728
Aluminium, in bars.....	Cwt.	77,224	1,160,242	49,901	747,587
" manufactures of.....	"		3,741		1,555
Bricks.....	M	390	2,762	394	3,977
Calcium carbide.....	Lbs.			4,888,975	142,402
Cement.....			12,914		4,067
Clay, manufactures of.....			9,061		2,071
Coke.....	Tons.	57,971	250,715	9,852	39,823
Earthenware, and all manufactures of.....					6,101
Grindstones, manufactured.....			23,164		29,184
Gypsum and plaster ground.....			12,306		4,429
Iron and steel:—					
Castings, N.E.S.....			51,958		33,441
Gas buoys and parts of.....					68,485
Hardware, tools, etc.....			88,844		94,513
" N.E.S.....			43,472		44,199
Machinery (Linotype machines).....			39,438		12,239
" N.E.S.....			301,961		431,493
Pig iron.....	Tons.	9,763	296,310	5,870	271,968
Scrap iron and steel.....	Cwt.	233,264	171,603	84,153	54,618
Sewing machines.....	No.	17,834	188,196	18,519	218,075
Steel and manufactures of.....			1,110,925		769,692
Stoves.....	No.	1,058	15,832	1,176	20,626
Typewriters.....	"	5,970	409,326	4,771	318,935
Vehicles—					
Automobiles.....	"	387	433,663	1,509	1,184,506
" parts of.....					45,798
Bicycles.....	No.	72	2,710	90	5,936
" parts of.....			28,654		50,828
Lime.....			44,762		39,536
Metals, N.O.P.....			133,426		175,716
Naphtha and gasoline.....	Gals.			23,959	4,427
Plumbago, manufactures of.....			66,658		33,956
Stone, building.....			80		456
" ornamental.....			5,272		980
Tar.....					56,669
Tin, manufactures of.....					30,176
Total manufactures.....			9,620,592		11,424,905
Grand total.....			51,856,862		52,546,593

## EXPORTS.

Showing Destination of Mine Products during the Fiscal Years  
1909-10 and 1910-11.

Destination.	1909-10 Value.	1910-11 Value.
	\$	\$
United States .....	33,458,464	33,129,505
United Kingdom .....	3,820,574	6,726,015
Newfoundland and Labrador .....	528,031	580,632
Alaska .....		392,715
Hong Kong .....	216,514	376,553
Mexico .....	325,153	302,055
Chinese Empire .....	777,147	301,870
Germany in Europe .....	43,975	239,596
Belgium .....	177,675	220,244
Australia and Tasmania .....	212,950	161,017
France .....	110,222	116,326
Japan .....	202,071	85,247
Bermuda .....	53,071	66,525
St. Pierre and Miquelon Islands .....	28,450	24,941
Holland and Netherlands .....	17,218	21,609
British West Indies .....	13,552	11,904
Cuba .....	14,946	10,161
Italy .....	10,956	8,000
British Possessions (All other) .....	10,903	2,768
Central American States and Costa Rica .....	66	2,376
Uruguay .....		1,742
New Zealand .....	8,518	2,309
Argentina .....	4,516	1,383
San Domingo .....		1,000
Austria-Hungary .....	1,030	720
Switzerland .....	73	300
Dutch Guiana .....		48
Other countries .....	20,942	
	40,087,017	42,787,561

## IMPORTS.

Imports of Products of the Mine and Manufactures of Mine Products—  
Calendar Years 1910 and 1911.

Products.	1910 Value.	1911 Value.
	\$	\$
Alumina.....	403,283	372,009
Alum, alum cake, and chloralum.....	26,145	88,516
Aluminium and manufactures.....	756,550	648,046
Antimony.....	25,296	36,405
Antimony salts.....	9,152	2,418
Arsenic, oxide and sulphide of.....	15,837	6,823
Asbestos.....	230,489	319,815
Asphaltum.....	441,945	558,784
Bells and gongs.....	111,185	104,965
Bismuth.....	6,996	7,012
Blanc fixe and satin white.....	22,726	29,796
Blast furnace slag.....	105,574	141,136
Borax.....	103,177	120,313
Brick and tile.....	943,846	1,555,347
Brick, fire, of a kind not made in Canada.....	811,927	814,414
Bromine.....	323	40
Burrstones.....	854	1,642
Cement, hydraulic, Portland and manufactures.....	476,113	848,416
Chalk, Cornwall stone, feldspar, fluorspar, etc.....	121,959	147,640
Clays.....	292,508	270,247
Coal: anthracite, bituminous, slack, and run of mine.....	28,450,001	39,292,591
Coal tar and coal pitch.....	74,352	81,555
Coke.....	1,908,725	1,843,248
Coke, ground, for electric batteries.....		6,840
Copper and manufactures of.....	4,369,773	4,936,769
Cryolite.....	54,561	29,602
Crucibles, clay or plumbago.....	52,896	56,814
Chloride of lime.....	116,923	118,601
Cyanides, of potassium, sodium, cyanogen, or cpd of bromine.....	90,639	94,397
Diamonds, unset, and bort.....	2,231,824	2,612,150
Earthenware.....	2,283,116	2,516,536
Earths, crude.....	8,228	9,398
Electric carbons.....	56,704	56,529
Emery.....	133,290	150,444
Fertilizers, compound or manufactured.....	388,467	386,645
Flint, quartz, silix, etc.....	45,942	56,624
Foundry facings.....	23,441	21,816
Fullers earth.....	6,015	7,024
Fossils.....	3,171	1,180
Gannister.....	2,344	2,821
Gold and silver and manufactures of.....	2,393,860	2,480,017
Graphite and manufactures of.....	59,957	56,132
Grindstones.....	71,394	123,356
Gypsum and plaster of Paris.....	169,798	205,782
Iron and steel.—Total* 1910: \$75,758,594; 1911: \$93,165,437		
Agricultural implements.....	3,816,505	4,508,094
Bar iron or steel, rolled, whether in coils, bundles, rods or bars.....	2,901,814	3,017,349
Castings, iron or steel, N.O.P.....	547,731	794,953
Cutlery.....	1,018,065	1,041,412
Engines, locomotive and others.....	2,415,497	3,221,249
Iron, pig.....	3,400,183	2,681,795
Iron or steel blooms, billets, puddled bars and loops, ingots, cogged ingots, slabs, or other forms, N.O.P., etc.....	790,195	1,671,207
" " rolled, angles, tees, beams, channels, girders, etc.....	4,843,429	5,091,695
" " rolled, not less than 30" wide nor less than $\frac{1}{4}$ " thick.....	1,771,330	1,503,123
" " skelp, sheared or rolled in grooves, etc.....	1,813,131	1,914,819
" " sheets, flat galvanized, Canada plates, etc.....	4,446,505	4,487,900
Machines and machinery.....	19,979,850	28,250,006
Steel rails.....	756 581	2,583 486

## IMPORTS.

Imports of Products of the Mine and Manufactures of Mine Products—  
Calendar Years 1910 and 1911—*Continued.*

Products.	1910. Value.	1911. Value.
	\$	\$
Iron and steel— <i>Con.</i>		
Tubing.....	2,025,021	2,372,182
Wire.....	3,572,046	3,622,766
All other iron and steel and manufactures of.....	21,660,761	26,403,401
Iron sand.....	6,647	8,340
Kainite.....	4,905	9,262
Lead and manufactures of.....	833,743	1,049,276
Lime.....	138,847	161,985
Litharge.....	56,049	65,743
Lithographic stone.....	10,441	12,344
Manganese, oxide of.....	17,133	22,612
Magnesia.....	10,847	11,012
Meerschbaum.....	26	150
Mercury or quicksilver.....	63,450	67,416
Metallic alloys:		
Babbitt metal.....	24,931	35,073
Brass and manufactures of.....	2,862,686	3,218,942
Britannia metal.....	45,132	32,430
German silver, nickel, and nickel silver.....	123,521	147,315
Type metal.....	159	321
Mineral and bituminous substances.....	76,327	168,577
Mineral water, including aerated water.....	202,306	229,367
Nickel anodes.....	23,317	34,199
Ochres, etc.....	55,393	53,092
Ores of metals, N.O.P.....	4,302,801	4,014,748
Paraffin wax.....	58,673	75,661
Paraffin candles.....	21,433	30,763
Petroleum and products of.....	4,826,763	6,009,730
Phosphate (fertilizer).....	72,950	46,217
Platinum and manufactures of.....	102,318	176,101
Potash and manufactures of.....	191,912	203,989
Precious stones.....	306,984	344,659
Pumice.....	14,829	18,779
Salt.....	462,061	436,118
Saltpetre.....	90,488	101,082
Sand and gravel.....	196,766	240,613
Slate and manufactures of.....	142,285	169,685
Sand paper.....	148,384	164,474
Soda products: barilla, bichromate, caustic, salt, and salt cake.....	767,846	800,805
Stone and manufactures of (including marble).....	845,123	1,140,852
Soda, nitrate of.....	767,562	867,778
Sulphate of iron.....	10,094	4,773
Sulphur and phosphorus.....	476,684	450,875
Sulphuric acid.....	21,702	9,281
Talc.....		6,413
Tin and manufactures of (including tinware).....	4,045,256	5,442,551
Whiting and prepared chalk.....	129,509	136,022
Zinc and manufactures of.....	1,086,829	1,227,660
	147,305,012	181,839,077

## METALLIC ORES AND PRODUCTS.

*Antimony.*—The production of antimony in 1911 was limited to a few pounds of refined antimony recovered at the lead refinery at Trail, B.C. Shipments of antimony ore in 1910 were reported as 364 tons valued at \$13,906. There was no production of refined antimony in 1910, but 61,207 pounds valued at \$4,285 were produced in 1909. An export of antimony ore in 1911 is reported of 57 tons valued at \$4,946, as against exports of 239 tons valued at \$14,095 in 1910. The imports of antimony or regulus thereof, in 1911, were 561,046 pounds valued at \$36,405, and of antimony salts 18,420 pounds valued at \$2,418 or a total value of imports of \$38,823. In 1910, the imports were antimony and regulus of 388,952 pounds valued at \$25,296, and antimony salts 94,330 pounds valued at \$9,152, or a total value of \$34,448.

*Cobalt.*—The mine owners received no payment on account of cobalt contents of ores shipped in 1911, as against \$51,986 received in 1910. Cobalt oxide and cobalt material are being produced in Canadian smelters, the production, in 1911, of cobalt oxide and nickel oxide being 154,174 pounds and of cobalt material and mixed cobalt and nickel oxides 1,260,832 pounds, the value being \$221,690. During 1910, the shipments as reported by the Ontario Bureau of Mines included 13,508 pounds of cobalt oxide valued at \$9,630, and 108,178 pounds of mixed oxides of nickel and cobalt valued at \$18,760.

*Copper.*—The production of copper contained in blister, matte or ore which was practically all exported was 55,648,011 pounds in 1911, valued at \$6,886,998, as compared with 55,692,369 pounds, valued at \$7,094,094, in 1910.

The exports in 1911 were reported as 55,287,710 pounds, valued at \$5,467,725, as against exports of 56,964,127 pounds, valued at \$5,840,553, in 1910. The total imports of copper in 1911 were valued at \$4,936,769; and included crude and manufactured copper to the extent of 37,352,237 pounds valued at \$4,721,480, together with other manufactures of copper of which the quantity is not recorded, valued at \$215,289. The copper imports in 1910 were valued at \$4,369,773, including 30,237,106 pounds of crude and manufactured copper, valued at \$4,219,451, and other copper manufactures of which the quantity is not recorded, valued at \$150,322.

*Gold.*—The total value of the production of gold in 1911 was \$9,781,077, representing 473,159 fine ounces of metal and showing a decrease of \$424,758 or over 4 per cent from the production of 1910, which was valued at \$10,205,835, representing 493,707 fine ounces.

The Yukon placer production in 1911 was \$4,580,000, as against \$4,550,000 in 1910.

Of the total production in 1911 about \$5,014,207 were derived from alluvial workings; \$513,991 as bullion from milling ores, and \$4,252,879 from ores and concentrates sent to smelters. In 1910, \$5,091,850 were derived from alluvial



workings; \$680,349 as bullion from milling ores, and \$4,433,628 obtained from ores and concentrates sent to smelters.

The exports of gold bearing dust, quartz, nuggets, and gold in ore, etc., in 1911, were valued at \$7,493,523, as against \$5,491,051 in 1910.

The imports of gold coin during the calendar year 1911 were \$20,437,799, and of gold bullion \$924,233.

*Pig Iron.*—The total production of pig iron in Canadian blast furnaces in 1911 was 917,535 tons valued at \$12,307,125, of which it is estimated 875,349 tons valued at \$11,693,721 should be credited to imported ores and 42,186 tons valued at \$613,404 to domestic ores. In 1910 the total production was 800,797 tons valued at \$11,245,622, of which 104,906 tons valued at \$1,650,849 were credited to Canadian ore.

The exports of pig iron, including ferro-products, in 1911, were 5,870 tons, valued at \$271,968, as against 9,763 tons valued at \$296,310 in 1910. The imports of pig iron in 1911 were 208,487 tons valued at \$2,610,989, and ferro-manganese, etc., 17,226 tons valued at \$429,465, as compared with imports in 1910 of pig iron 227,753 tons valued at \$3,122,695; charcoal pig iron 16,106 tons valued at \$242,152; and ferro-manganese 18,900 tons valued at \$464,741.

The total exports of iron and steel and manufactures thereof, in 1911, were valued at \$9,907,281, as against \$7,895,489 in 1910. The imports of iron and steel and manufactures thereof during the calendar year 1911 were valued at \$93,165,437, as compared with \$75,758,594 during the calendar year 1910.

*Iron Ore.*—The total shipments of iron ore from Canadian mines in 1911 were 210,344 tons, valued at \$522,319, as compared with 259,418 tons valued at \$574,362 in 1910. The exports of iron ore in 1911 were 37,686 tons, valued at \$133,411; as against 114,499 tons valued at \$324,186 exported in 1910. The quantity of imported iron ore used in Canada in 1911 was about 1,628,368 tons, as compared with 1,377,035 tons of imported ore used in 1910.

*Lead.*—The production of lead in 1911 was 23,784,969 pounds valued at \$827,717, as against 32,987,508 pounds, valued at \$1,216,249, in 1910. The exports of lead in 1911 were: lead in ore, etc., 65,100 pounds; pig lead 71,961 pounds—total 137,061 pounds; while in 1910 the exports were: lead in ore, etc., 46,800 pounds; pig lead 7,712,253 pounds—total 7,759,053 pounds. The total value of the imports of lead and manufactures of, in 1911, was \$1,049,276, as compared with imports in 1910 valued at \$833,743.

*Nickel.*—The production of nickel contained in nickel-copper 'matte' produced in Canada and exported for refinement was, in 1911, 34,098,744 pounds, as compared with a production of 37,271,033 pounds in 1910. During 1911 there were smelted 610,834 tons of ore producing 32,607 tons of matte, as against 628,947 tons of ore smelted in 1910, producing 35,033 tons of matte. Small quantities of nickel oxide are also produced in connexion with the treatment of the Cobalt District silver ores. The exports of nickel contained in ore, matte,

etc., during 1911, were 32,619,971 pounds valued at \$3,676,396: being 5,023,393 pounds to Great Britain and 27,596,578 pounds to the United States. In 1910 the exports were 36,014,782 pounds valued at \$4,039,040: being 5,335,331 pounds to Great Britain and 30,679,451 pounds to the United States. The imports of nickel and nickel anodes in 1911 were valued at \$34,199, as against a value of \$23,817 imported in 1910.

*Silver.*—The production of silver contained in bullion, or estimated as recovered from mattes and ore, etc., exported was, in 1911, 32,559,044 fine ounces valued at \$17,355,272, as compared with a production of 32,869,264 fine ounces valued at \$17,580,455 in 1910. About 93.8 per cent of the production in 1911 was derived from "Cobalt District" of Ontario. The production of silver in 1905 was only 6,000,023 ounces, and in 1900, 4,468,225 ounces. The exports of silver contained in ores, mattes, etc., in 1911, were 31,216,725 ounces valued at \$15,807,366; as against exports of 30,699,770 ounces valued at \$15,649,537 in 1910. The imports of silver bullion during the calendar year 1911 were valued at \$847,645, as compared with bullion imports of \$502,772 in 1910.

*Zinc.*—The shipments of zinc ore in 1911 were 2,590 tons valued at \$101,072, as compared with shipments of 5,063 tons valued at \$120,003 in 1910. The total value of the imports of zinc and manufactures of zinc, in 1911, was \$1,227,660, as compared with imports valued at \$1,086,829 in 1910.

## NON-METALLIC PRODUCTS.

*Actinolite.*—A production of 67 tons valued at \$736 was reported in 1911, as compared with 30 tons valued at \$330 in 1910.

*Arsenic.*—Smelter returns show a production in 1911 of 2,097 tons of arsenious oxide valued at \$76,237, as compared with a production in 1910 of 1,502 tons valued at \$75,328. There was also a production, in 1910, of 547 tons of arsenical ore valued at \$5,716.

The exports of arsenic in 1911 were 2,063 tons valued at \$81,761, as against 2,256 tons valued at \$173,932 exported in 1910. The imports of arsenious oxide in 1911 were 7,338 pounds valued at \$158, as compared with 260,415 pounds valued at \$6,891 in 1910. The imports of sulphate of arsenic in 1911 were 330,170 pounds, valued at \$6,665, and in 1910, 257,451 pounds valued at \$8,946.

*Asbestos.*—The shipments of asbestos in 1911 were 101,393 tons valued at \$2,922,062, and of asbestic 26,021 tons valued at \$21,046. The shipments in 1910 were 77,508 tons of asbestos valued at \$2,555,974, and 24,707 tons of asbestic valued at \$17,629. The shipments in 1911 consisted of 4,864.1 tons of crude asbestos valued at \$744,962, and 96,529 tons of mill stock valued at \$2,177,100. Considerable quantities both of crude and of mill stock were held in manufacturers' hands at the close of the year.

Exports in 1911 were 75,120 tons valued at \$2,067,259, as against 71,485 tons valued at \$2,108,632 in 1910.

Imports and manufactures of asbestos in 1911 were valued at \$319,815, and in 1910, \$230,489.

*Chromite.*—Shipments of chromite in 1911 were reported as 157 tons valued at \$2,587, as compared with shipments of 299 tons valued at \$3,734 in 1910.

*Coal.*—The production of coal in 1911 was 11,323,388 tons valued at \$26,467,646, as against 12,909,152 tons valued at \$30,909,779 in 1910. The exports of coal in 1911 were 1,500,639 tons valued at \$4,357,074, as compared with 2,377,049 tons valued at \$6,077,350 exported in 1910. The total imports of coal in 1911 were 14,558,892 tons valued at \$39,292,591, as against imports in 1910 of 10,597,982 tons valued at \$28,450,001.

The 1911 imports included 8,905,815 tons of bituminous round and run of mine coal, valued at \$18,407,603; 4,020,577 tons of anthracite and anthracite dust, valued at \$18,794,192; and 1,632,500 tons of bituminous slack, such as will pass through a  $\frac{3}{4}$ " screen, valued at \$2,090,796.

In 1910 the imports included 5,966,466 tons of bituminous round and run of mine valued at \$11,919,341; 3,266,235 tons of anthracite and anthracite dust valued at \$14,735,062; and 1,365,281 tons of bituminous slack, such as will pass through a  $\frac{3}{4}$ " screen, valued at \$1,795,598. The consumption of coal in 1911 was approximately 24,247,698 tons, as against 20,970,226 tons in 1910.

*Coke.*—The total quantity of oven coke made in 1911 was 954,388 tons, the quantity sold or used was 935,651 tons, valued at \$3,630,410; as compared with 901,269 tons made and 902,715 tons sold or used, valued at \$3,462,872, in 1910. The quantity of coal charged to coke ovens, in 1911, was 1,409,844 tons, as against 1,373,793 tons in 1910. The exports of coke in 1911 were 9,852 tons valued at \$39,823, and in 1910, 57,971 tons valued at \$250,715. The imports of coke in 1911 were 751,389 tons valued at \$1,843,248, as compared with imports of 737,088 tons valued at \$1,908,725 in 1910.

*Corundum.*—The total sales of grain corundum in 1911 were 1,472 tons valued at \$161,873, as compared with sales in 1910 of 1,870 tons valued at \$198,680.

*Feldspar.*—Shipments of feldspar in 1911 were 17,723 tons valued at \$51,939, as compared with 15,809 tons valued at \$47,667 shipped in 1910. The exports are recorded as 16,150 tons valued at \$56,085 in 1911 and 15,601 tons valued at \$47,962 in 1910.

*Fluorspar.*—About 34 tons valued at \$238 were shipped from the mine in 1911 and 2 tons valued at \$15 in 1910. Canadian steel furnaces in 1911 used 8,067 tons of fluorspar.

*Graphite.*—Shipments of crude and milled graphite during 1911 totalled 1,269 tons valued at \$69,576, as against 1,392 tons valued at \$74,087 shipped in



1910. The production of artificial graphite in 1911 was reported as 1,086 tons, as compared with 1,221 tons in 1910.

Exports of plumbago in 1911 are reported as 813 tons valued at \$43,249, and manufactures of plumbago valued at \$33,956. Exports in 1910 were: plumbago 788 tons valued at \$53,008, and manufactures of plumbago valued at \$66,658. Imports of graphite in 1911 were valued at \$112,946 and included: plumbago not ground, \$4,940; blacklead, \$14,172; plumbago ground and manufactures of, \$37,020; and crucibles of clay or plumbago, \$56,814. In 1910 the imports were valued at \$112,853, including: plumbago not ground, \$4,867; blacklead, \$10,048; plumbago ground and manufactures of, \$45,042; and crucibles of clay or plumbago, \$52,896.

*Grindstones.*—The production of grindstones, scythestones, and wood pulpstones, in 1911, was 4,566 tons valued at \$52,942, as compared with 3,973 tons valued at \$47,196 in 1910. The exports in 1911 included: stone for the manufacture of grindstones, 15 tons valued at \$22; and manufactured grindstones valued at \$29,184; the exports in 1910 were: stone for the manufacture of grindstones, 308 tons valued at \$338; and manufactured grindstones valued at \$23,164. The imports of abrasives in 1911 included: grindstones valued at \$123,356; burrstones, \$1,642; emery in bulk crushed or ground, \$46,274; manufactures of emery, carborundum, etc., \$104,170; pumice stone, \$18,779; also iron sand, \$8,340; sandpaper, \$164,474. The 1910 imports comprised: grindstones, valued at \$71,394; burrstones, \$854; emery in bulk crushed or ground, \$40,400; manufactures of emery, carborundum, etc., \$92,890, and pumice stone, \$14,829.

*Gypsum.*—The total shipments of gypsum crude and calcined, in 1911, were 518,383 tons valued at \$993,394, as compared with shipments of 525,246 tons valued at \$934,446 in 1910. The tonnage of gypsum mined or quarried in 1911 was 495,979 tons, and the quantity calcined 76,718 tons. In 1910, 548,019 tons of gypsum were mined or quarried and 69,889 tons calcined. The shipments in 1911 included: crude gypsum, 449,823 tons valued at \$481,077; ground gypsum, 7,149 tons valued at \$23,125, and calcined gypsum, 61,411 tons valued at \$489,192. In 1910 shipments comprised: crude gypsum, 469,573 tons valued at \$508,686; ground gypsum, 6,121 tons valued at \$17,390, and calcined gypsum, 49,552 tons valued at \$408,370. The exports of gypsum in 1911 were: 362,102 tons of crude gypsum valued at \$425,161, and gypsum ground or calcined valued at \$4,429. The 1910 exports were: 346,081 tons of crude gypsum valued at \$416,725, and gypsum ground or calcined valued at \$12,306.

The imports of gypsum in 1911 were valued at \$205,782, including: crude gypsum, 2,035 tons valued at \$11,792; ground gypsum, 11,208 tons valued at \$3,619, and plaster of Paris, 28,518 tons valued at \$190,371. The total value of imports in 1910 was \$169,798, made up of: crude gypsum, 12,271 tons valued at \$21,073; ground gypsum, 6,690 tons valued at \$13,242, and plaster of Paris, 19,045 tons valued at \$135,483.

*Magnesite.*—Shipments of magnesite in 1911 were 991 tons valued at \$5,531, and in 1910, 323 tons valued at \$2,160.

*Manganese.*—There was a shipment of 5½ tons valued at \$300 in 1911—no shipment reported in 1910. The exports in 1911 were 4 tons valued at \$225, as against 4 tons valued at \$160 in 1910. The 1911 imports included 962 tons manganese oxide valued at \$22,612, as compared with 649 tons valued at \$17,133 in 1910.

*Mica.*—The value of the mica production in 1911 as reported by mine operators was \$128,677, as compared with \$190,385 in 1910. The exports of mica in 1911 were 693,940 pounds valued at \$242,548, as against 937,263 pounds valued at \$330,903 in 1910.

*Mineral Pigments.*—Shipments of barytes in 1911 were 50 tons valued at \$400—no production was reported in 1910. The production of iron ochres in 1911 was 3,622 tons valued at \$28,333, as compared with 4,813 tons valued at \$33,185 in 1910.

The exports of iron oxides in 1911 were 2,000 tons valued at \$27,070, as against 1,746 tons valued at \$29,839 in 1910. The imports in 1911 were: ochres and ochrey earth and raw siennas, 1,477 tons valued at \$32,032; and oxides, dry fillers, fireproof umbers, and burnt siennas, 722 tons valued at \$21,060, as compared with imports in 1910, comprising: ochres and ochrey earth and raw siennas, 1,246 tons valued at \$31,926; and oxides, dry fillers, fireproof umbers, and burnt siennas, 868 tons valued at \$23,467.

*Mineral Water.*—The value of the production of mineral water in 1911 for which returns were received was \$223,758, as compared with a value of \$199,563 in 1910. The imports of mineral and aerated waters in 1911 were valued at \$229,367, as against a value of \$202,306 in 1910.

*Natural Gas.*—The value of the production of natural gas in 1911 was \$1,917,678, as compared with a value of \$1,346,471 in 1910.

*Peat.*—Shipments of peat for fuel purposes in 1911 were 1,463 tons valued at \$3,817, as compared with 841 tons valued at \$2,604 in 1910.

*Petroleum.*—The production of crude petroleum shows a further falling off in 1911, the production being 291,092 barrels or 10,188,219 gallons valued at \$357,073; as compared with 315,895 barrels or 11,056,337 gallons valued at \$388,550, in 1910.

Exports of refined oil in 1911 were 23,959 gallons valued at \$4,427, and 2,818 gallons valued at \$462 in 1910. There was an export in 1911 of naphtha and gasoline of 23,959 gallons valued at \$4,427, and also an export of other oils, N.E.S. of 745,318 gallons valued at \$85,634, which may have included products of petroleum.

While the production has been decreasing the imports have been increasing; the total import of petroleum oils, crude and refined, in 1911, was 116,892,689



gallons valued at \$6,009,730, in addition to 1,959,787 pounds of paraffin wax and candles valued at \$106,424. The oil imports included: crude oil, 71,653,251 gallons valued at \$2,188,870; refined and illuminating oils, 13,690,962 gallons valued at \$722,403; gasoline, 23,338,773 gallons valued at \$1,976,032; lubricating oils, 5,308,917 gallons valued at \$806,452, and other petroleum products, 2,900,786 gallons valued at \$315,973.

The total imports in 1910 were 84,629,334 gallons valued at \$4,826,763, in addition to 1,362,235 pounds of paraffin wax and candles valued at \$80,106. The oil imports in 1910 included: crude oil, 53,604,053 gallons valued at \$1,639,358; refined and illuminating oils, 7,656,727 gallons valued at \$502,364; gasoline, 16,679,691 gallons valued at \$1,693,296; lubricating oils, 4,081,257 gallons valued at \$718,381, and other petroleum products, 2,607,606 gallons valued at \$273,364.

*Phosphate.*—Shipments of phosphate or apatite in 1911 were 621 tons valued at \$5,206, as compared with 1,478 tons valued at \$12,578 shipped in 1910. The exports in 1911 were 3 tons valued at \$100 and no exports reported for 1910. There was also an export of phosphorus, in 1911, of 524,370 pounds valued at \$76,608. The imports of phosphate rock (fertilizer) in 1911 were valued at \$46,217; phosphorus, 14,818 pounds valued at \$4,384, and manufactured fertilizers valued at \$386,645. The imports in 1910 included phosphate rock (fertilizer), valued at \$72,950; phosphorus, 6,752 pounds valued at \$2,065, and manufactured fertilizers valued at \$388,467.

*Pyrites.*—The production of pyrites in 1911 was 82,666 tons valued at \$365,820, as compared with 53,870 tons valued at \$187,064 in 1910. The exports of pyrites in 1911 were 32,102 tons valued at \$120,585, as against exports of 30,434 tons valued at \$110,071 in 1910. The imports of brimstone or sulphur in 1911 were 21,931 tons valued at \$446,491, as against 22,835 tons valued at \$474,619 in 1910.

*Quartz.*—The production of quartz in 1911 was reported as 60,526 tons valued at \$83,865, compared with a production in 1910, of 88,205 tons valued at \$91,951. There were imported during 1911, 394 tons of silex or crystallized quartz, valued at \$7,518, and 3,766 tons flint valued at \$49,106; and in 1910, 628 tons of silex, valued at \$11,996.

*Salt.*—The total sales of salt in 1911 were 91,582 tons valued at \$443,004 (exclusive of packages). The value of the packages used was \$198,789. In 1910 the sales were 84,092 tons valued at \$409,624, and value of packages used, \$173,446.

Exports of salt in 1911 were 454,600 pounds, valued at \$5,055, and in 1910, 275,200 pounds, valued at \$2,618. The total imports of salt in 1911 were valued at \$436,118, and included: 23,176 tons valued at \$109,793, subject to duty; and 101,174 tons valued at \$326,325, duty free. The 1910 imports were valued at \$462,061 and comprised 20,174 tons valued at \$97,326 subject to duty; and 108,794 tons duty free valued at \$364,735.

Among the imports of soda products in 1911 are included: soda ash or barilla, 44,682,937 pounds valued at \$375,132; soda bichromate, 327,307 pounds valued at \$19,193; caustic soda in packages of 25 pounds or more, 13,708,922 pounds valued at \$253,612; sal soda, 10,202,422 pounds, valued at \$64,107; nitrate of, 58,808,637 pounds, valued at \$867,778, and sulphate of soda, 13,782,241 pounds, valued at \$88,761.

*Talc.*—The production of talc in 1911 was 7,300 tons valued at \$22,100, as against 7,112 tons valued at \$22,308, in 1910. Imports of talc for the nine months ending December, 1911, were 263 tons valued at \$6,413.

*Tripolite.*—Twenty tons of tripolite valued at \$122 were shipped in 1911, and 22 tons valued at \$134 in 1910.

## STRUCTURAL MATERIALS AND CLAY PRODUCTS.

*Cement.*—The total sales of cement in 1911 were 5,692,915 barrels, valued at \$7,644,537, as against 4,753,975 barrels, valued at \$6,412,215, sold in 1910, showing an increase of 938,940 barrels. The exports of cement in 1911 were valued at \$4,067, as compared with exports valued at \$12,914 in 1910.

The imports of cement in 1911 included: manufactures of cement valued at \$7,430; hydraulic cement, 26,655 hundredweight, valued at \$6,107; and Portland cement, 2,316,707 hundredweight (661,916 barrels), valued at \$834,879. The imports in 1910 were: manufactures of cement, valued at \$7,718; hydraulic cement, 365 hundredweight, valued at \$349; and Portland cement, 1,222,586 hundredweight (349,310 barrels), valued at \$468,046.

The consumption of Portland cement in Canada in 1911 was approximately 6,354,831 barrels, as compared with 5,103,285 barrels in 1910.

*Clay Products.*—The total value of the production of clay products in Canada in 1911 was \$8,359,933, as compared with a total value of \$7,629,956 in 1910. Brick and tile products alone were valued in 1911 at \$6,946,009, as against \$6,377,728 in 1910. The value of sewerpipe production in 1911 was \$812,716, as compared with \$774,110 in 1910. The only clay products exported in 1911 were 394,000 building brick, valued at \$3,977, and manufactures of clay valued at \$2,071; against 390,000, valued at \$2,762, in 1910, and manufactures valued at \$9,061. The total imports of clay products in 1911 were valued at \$5,156,544, and included: brick and tile valued at \$2,369,761; earthenware and chinaware, \$2,516,536, and clays valued at \$270,247. The total imports in 1910 were valued at \$4,331,397, comprising: brick and tile, \$1,755,773; earthenware and chinaware, \$2,283,116, and clays, \$292,508.

*Lime.*—The total production of lime in 1911 was 7,533,525 bushels, valued at \$1,517,756, as compared with 5,848,146 bushels, valued at \$1,137,079, in 1910.

The exports of lime in 1911 were valued at \$39,536, as against exports valued at \$44,762, in 1910. The imports of lime in 1911 were 228,538 barrels, valued at \$161,985, and in 1910, 212,502 barrels valued at \$138,847.

*Sand-Lime Brick.*—The total sales of sand-lime brick in 1911 by 16 firms reporting were 51,535,243, valued at \$442,427, an average value of \$8.58 per thousand. The sales in 1910 by 13 firms reporting were 44,593,541 brick, valued at \$371,857, an average of \$8.34 per thousand.

*Slate.*—The production of slate in 1911 was 1,833 squares valued at \$8,248, and 3,959 squares valued at \$18,492, in 1910.

The imports of slate in 1911 were valued at \$169,685, and included: roofing slate valued at \$83,075; school writing slate, \$35,049; slate pencils, \$6,036, and manufactures of slate, \$45,525. The imports in 1910 were valued at \$142,285, comprising: roofing slate, \$67,063; school writing slate, \$31,397; slate pencils, \$6,948, and manufactures of slate, \$36,877.

*Stone.*—The total value of the production of stone of all kinds in 1911 was \$4,328,757, as compared with a value of \$3,650,019 in 1910. The value of stone exports in 1911 was \$28,335, as against \$27,571 in 1910; and the total value of stone imported in 1911 was \$1,140,846, as against imports valued at \$845,123, in 1910.

The production in 1911 included: granite, valued at \$1,119,865; limestone, \$2,594,926; marble, \$162,783, and sandstone, \$451,183. In 1910 the production of granite was valued at \$739,516; limestone, \$2,249,576; marble, \$158,779, and sandstone, \$502,148.

Classifying the output according to the purposes for which the stone was used, the production in 1911 comprised: building stone, valued at \$1,368,693; ornamental and monumental stone, \$303,050; paving and curbstone, \$233,723; rubble, \$460,803; crushed stone, \$1,509,498; and furnace flux, \$452,990; while in 1910 the production included: building stone, valued at \$1,504,001; ornamental and monumental stone, \$147,421; paving and curbstone, \$239,668; rubble, \$352,000; crushed stone, \$975,379, and furnace flux, \$431,550.

## PRODUCTION BY PROVINCES.

A summary of the mineral production by provinces in 1910 and 1911 is shown in the accompanying tables, in the first of which the total production in the several provinces, and the percentage of each, are given for the past three years. It will be observed that the largest production during each year has been from the Province of Ontario, British Columbia occupying second place. These two Provinces together contributed about 62 per cent of the total production in 1911. The Province of Alberta occupied fourth place in mineral production in 1910 but was again displaced by Quebec in 1911.

The last table shows the total mineral production of Canada by provinces for the years 1899 to 1911 inclusive.

### Mineral Production by Provinces, 1909, 1910, and 1911.

Province.	1909.		1910.		1911.	
	Value of production.	Per cent of total.	Value of production.	Per cent of total.	Value of production.	Per cent of total.
	\$	%	\$	%	\$	%
*Nova Scotia.....	12,504,810	13·62	14,195,730	13·29	15,409,397	14·93
New Brunswick.....	657,635	0·71	581,942	0·54	612,830	0·59
Quebec.....	7,086,265	7·72	8,270,136	7·74	9,304,717	9·01
Ontario.....	37,374,577	40·70	43,538,078	40·76	42,796,162	41·46
Manitoba.....	1,193,377	1·30	1,500,359	1·40	1,791,772	1·74
Saskatchewan.....	456,246	0·50	498,122	0·47	636,706	0·62
Alberta.....	6,047,447	6·58	8,996,210	8·42	6,662,673	6·46
British Columbia.....	22,479,006	24·48	24,478,572	22·92	21,299,305	20·63
North West Territories..	4,032,678	4·39	4,764,474	4·46	4,707,432	4·56
Dominion.....	91,831,441	100·00	106,823,623	100·00	103,220,994	100·00

\* Includes a small production of lime from Prince Edward Island.

### Mineral Production of Nova Scotia, 1910 and 1911.

Product.		1910.		1911.	
		Quantity.	Value.	Quantity.	Value.
			\$		\$
Gold.....	Ozs.	7,928	163,891	7,781	160,854
Iron ore sold for export.....	Tons.	18,134	51,330	22	50
Pig iron from Canadian ore (a).....	"	4,787	57,444		
Coal.....	"	6,431,142	12,919,705	7,004,420	14,071,379
Grindstones.....	"	3,586	43,700	380	3,382
Gypsum.....	"	400,455	458,638	353,999	406,457
Barytes.....	"			50	400
Manganese.....	"			5½	300
Tripolite.....	"	22	134	20	122
Clay products.....			204,782		274,249
Stone.....			227,635		292,914
Lime.....	Bus.	55,750	13,490	639,200	130,555
Other products.....			54,981		68,735
Total.....			14,195,730		15,409,397

(a) The total production of pig iron in Nova Scotia in 1910 was 350,287 tons valued at \$4,203,444, and in 1911, 390,242 tons valued at \$4,682,904.



## Mineral Production of New Brunswick, 1910 and 1911.

Product.	1910.		1911.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Iron ore sold for export..... Tons.	5,336	15,075	31,120	69,464
Coal..... "	55,455	110,910	55,781	111,562
Grindstones..... "	387	3,496	4,186	49,560
Gypsum..... "	90,236	213,579	93,205	115,044
Mineral water..... "		16,000		19,843
Petroleum..... Bls.	1,485	1,826	2,461	3,019
Clay products..... "		56,475		38,000
Lime..... Bus.	470,050	105,593	613,728	132,897
Stone..... "		58,988		73,441
Total.....		581,492		612,830

## Mineral Production of Quebec, 1910 and 1911.

Product.	1910.		1911.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Iron ore sold for export..... Tons.			3,616	6,479
Gold..... Ozs.	124	2,565	613	12,672
Copper..... Lbs.	877,347	111,757	2,436,190	301,503
Pig iron from Canadian ore (a)..... Tons.	2,474	65,156	379	9,949
Silver..... Ozs.	7,593	4,061	18,435	9,827
Asbestos and asbestic..... Tons.	102,215	2,573,603	127,414	2,943,108
Chromite..... "	299	3,734	157	2,587
Feldspar..... "	90	1,800	17	255
Magnesite..... "	323	2,160	991	5,531
Mica..... "		87,295		69,465
Ochres..... "	4,813	33,185	3,612	28,173
Mineral water..... "		68,194		63,637
Peat..... "	70	200	200	800
Phosphate..... "	1,456	12,386	586	4,909
Pyrites..... "	24,242	102,162	39,122	247,555
Quartz..... "	805	1,006	548	684
Graphite..... "	155	16,000	374	33,084
Cement..... Bls.	1,563,714	1,954,646	1,614,730	1,963,439
Clay products..... "		1,442,842		1,341,467
Lime..... Bus.	1,227,555	299,126	1,428,392	356,453
Slate..... Squares.	3,959	18,492	1,833	8,248
Stone..... "		1,469,686		1,894,892
Total.....		8,270,136		9,304,717

(a) The total production of pig iron in Quebec in 1910 was 3,237 tons valued at \$85,255; in 1911, 658 tons valued at \$17,282.

There was also in this Province an important production of aluminium from imported ores.



## Mineral Production of Ontario, 1910 and 1911.

Product.		1910.		1911.	
		Quantity.	Value.	Quantity.	Value.
			\$		\$
Copper. ....	Lbs.	19,259,016	2,453,213	17,932,263	2,219,297
Gold. ....	Ozs.	3,089	63,849	2,062	42,625
Pig iron from Canadian ore (b) . . . . .	Tons.	97,645	1,528,249	41,807	603,455
Iron ore sold for export. ....	"	90,979	257,781	5,379	12,577
Nickel. ....	Lbs.	37,271,033	11,181,310	34,098,744	10,229,623
Cobalt. ....			51,986		
Cobalt oxide and nickel oxide . . . . .	Lbs.			154,174	
Cobalt mineral and mixed cobalt and nickel oxide. ....	"			1,260,832	221,690
Silver. ....	Ozs.	30,366,366	16,241,755	30,540,754	16,279,443
Zinc ore. ....	Tons.	576	5,760		
Actinolite. ....	"	30	330	67	736
Arsenious oxide. ....	"	1,502	75,328	2,097	76,227
Corundum. ....	"	1,870	198,680	1,472	161,873
Feldspar. ....	"	15,719	45,867	17,706	51,684
Fluorspar. ....	"	2	15	34	238
Graphite. ....	"	1,237	58,087	895	36,492
Gypsum. ....	"	15,055	67,229	27,399	98,018
Mica. ....			103,090		59,212
Mineral water. ....			111,369		136,778
Natural gas. ....			1,271,393		1,807,513
Ochres. ....	Tons.			10	160
Peat. ....	"	771	2,324	1,263	3,017
Petroleum. ....	Bls.	314,410	386,724	288,631	354,054
Phosphate. ....	Tons.	22	192	35	297
Pyrites. ....	"	29,628	84,902	43,544	118,265
Quartz. ....	"	87,400	90,945	59,978	83,181
Salt. ....	"	84,092	409,624	91,582	443,004
Talc. ....	"	7,112	22,308	7,300	22,100
Cement. ....	Bls.	2,504,650	3,150,479	3,090,786	3,741,039
Clay products. ....			3,667,810		3,916,575
Lime. ....	Bus.	2,988,020	476,137	3,360,265	538,902
Stone. ....			898,788		892,305
Other products (a) . . . . .			632,644		645,772
Total. ....			43,538,078		42,796,162

(a) Includes in 1911 and 1910, sand-lime brick; sand and gravel (exports). (b) The total production of pig iron in Ontario in 1910 was 447,273 tons valued at \$6,956,923; in 1911, 526,635 tons valued at \$7,606,939.

### Mineral Production in Manitoba, 1910 and 1911.

Product.		1910.		1911.	
		Quantity.	Value.	Quantity.	Value.
			\$		\$
Gypsum.....	Tons.	19,500	195,000	43,000	372,000
Clay products.....			781,605		834,428
Lime.....	Bus.	606,679	100,808	706,888	140,629
Cement.....	Bls.	18,561	21,995	21,350	28,289
Sand-lime brick.....	No.	7,817,785	69,279	9,679,985	98,376
Other products (a).....			331,672		318,050
Total.....			1,500,359		1,791,772

(a) Includes building stone, etc.

### Mineral Production in Saskatchewan, 1910 and 1911.

Product.		1910.		1911.	
		Quantity.	Value.	Quantity.	Value.
			\$		\$
Coal.....	Tons.	181,156	293,923	206,779	347,248
Brick.....	No.	14,733,340	160,850	21,071,660	224,758
Other products (a).....			43,349		64,700
Total.....			498,122		636,706

(a) Includes in 1911, sand-lime brick, fireclay, etc.; in 1910, sand-lime brick.

### Mineral Production in Alberta, 1910 and 1911.

Product.		1910.		1911.	
		Quantity.	Value.	Quantity.	Value.
			\$		\$
Gold.....	Ozs.	89	1,850	10	207
Coal.....	Tons.	2,894,469	7,065,736	1,511,036	3,979,264
Natural gas.....			75,168		110,165
Cement.....	Bls.	323,009	774,473	512,176	1,241,535
Clay products.....			753,232		1,052,751
Lime.....	Bus.	303,214	69,268	434,038	100,407
Other products (a).....			256,483		178,344
Total.....			8,996,210		6,662,673

(a) Includes sand-lime brick and stone, 1910 and 1911.

### Mineral Production in British Columbia, 1910 and 1911.

Product.	1910.		1911.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Copper (a)..... Lbs.	35,270,006	4,492,693	35,279,558	4,366,198
Gold..... Ozs.	261,386	5,403,318	238,496	4,930,145
Lead..... Lbs.	32,987,508	1,216,249	23,784,969	827,717
Silver..... Ozs.	2,407,887	1,287,883	1,887,147	1,005,924
Zinc ore.....	4,487	114,243	2,590	101,072
Coal..... Tons.	3,330,745	10,408,580	2,542,532	7,945,413
Gypsum..... "			780	1,875
Mineral water.....		4,000		3,500
Clay products.....		562,360		675,505
Lime..... Bus.	196,878	72,657	351,014	117,756
Stone.....		422,392		698,811
Other products (c).....		494,197		625,389
Total.....		24,478,572		21,299,305

(a) Smelter recoveries of copper. (c) Includes cement, sand-lime brick, etc.

### Mineral Production in Yukon, 1910 and 1911.

Product.	1910.		1911.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Copper..... Lbs.	286,000	36,431		
Gold..... Ozs.	221,091	4,570,362	224,197	4,634,574
Silver..... "	87,418	46,756	112,708	60,078
Coal..... Tons.	16,185	110,925	2,840	12,780
Total.....		4,764,474		4,707,432

# Mineral Production by Provinces, 1899-1911.

Calendar Year.	Nova Scotia.	New Brunswick.	Quebec.	Ontario.	Manitoba.	Alberta.	Saskatchewan.	Yukon.	British Columbia.	Total.
1899.....	\$ 6,817,274	\$ 420,227	\$ 2,585,635	\$ 9,819,557	\$	\$ 17,108,707	\$	\$	\$ 12,482,605	\$ 49,234,005
1900.....	9,298,479	439,060	3,292,383	11,258,099		23,452,830			16,680,526	64,420,877
1901.....	7,770,150	467,985	3,759,984	13,970,010		19,297,940			20,531,833	65,797,911
1902.....	10,686,549	607,129	3,743,636	14,619,091		16,127,400			17,448,031	63,231,836
1903.....	11,431,914	580,495	3,585,938	14,160,033		14,082,956			17,899,147	61,740,513
1904.....	11,212,746	559,913	3,038,482	12,582,843		12,713,642			19,325,174	60,082,771
1905.....	11,507,047	558,035	4,405,975	18,833,292		11,387,642			22,386,008	69,078,999
1906.....	12,894,303	646,328	5,242,038	25,111,682		10,062,726			25,299,600	79,286,697
1907.....	14,532,040	664,647	6,205,553	30,331,638	898,775	4,657,524	533,251	3,335,898	25,656,056	86,865,202
1908.....	14,487,108	579,816	6,372,949	30,623,812	584,374	5,122,505	413,212	3,659,290	23,704,035	85,557,101
1909.....	12,504,810	657,035	7,086,265	37,374,577	1,193,377	6,047,437	456,246	4,032,673	22,479,006	91,831,441
1910.....	14,195,730	681,942	8,270,136	43,538,078	1,500,359	8,496,210	498,122	4,764,474	24,478,572	106,823,623
1911.....	*15,409,397	612,830	9,304,717	42,796,162	1,791,772	6,662,673	636,706	4,707,432	21,299,305	103,220,994

\* Includes a small production of lime from Prince Edward Island.

## MINE PRODUCTION.

The statistics of metalliferous production published in the tables preceding show in most cases the quantities of metals recovered or probably recoverable.

A general consideration of mine operations from the viewpoint of the actual tonnage of ore mined, the quantities concentrated, and the tonnage shipped to smelters is also of much interest.

The Mines Branch has with considerable success been endeavouring to obtain from every mine operator in Canada an annual return with respect to:—

(1) The number of men employed and wages paid.

(2) The total tonnage of ores mined, the tonnage concentrated, and the quantities of concentrates produced.

(3) The tonnage of ores or concentrates shipped and the net value thereof.

(4) The quantities of metals as determined by settlement assays contained in the ores shipped, and the quantities of metals for which payment was made by the purchasing smelter or recovered by the operators' smelter.

There are unfortunately two industries in which it has not as yet been feasible to obtain a complete record. These are the production of placer gold on the one hand and of petroleum on the other. In both cases, while a record of production is available, there is no record as to the number of men employed or the amount paid in wages. With respect to the other industries, while it has not been possible to obtain returns from every mine operator, the missing returns usually represent comparatively small productions and sufficient information is available to give a fairly close estimate of results.

The metalliferous ores mined in Canada fall naturally into a number of more or less broad groups, of which iron ores constitute a distinct class.

Milling gold ores, including certain dry ores shipped to smelters, may be considered as a second group.

The silver and silver-cobalt-nickel ores of Ontario fall naturally into a separate class, as do also the nickel-copper ores of the same Province. The silver-lead, and zinc ores chiefly of British Columbia may also be considered as a separate group.

A broad class of ores mined in British Columbia chiefly may be grouped under a general class as copper-gold-silver ores.

Statistics covering the years 1910 and 1911 are shown in tabular form herewith. The number of metalliferous mines shipping in 1911 was about 160, the number of men employed 9,622, wages paid \$7,857,580, tons of ore mined 3,195,330; tons of ore concentrates or metal shipped, 2,431,188; and total net value of shipments, including placer gold, \$34,760,513.

In non-metalliferous mining exclusive of stone quarries and clay pits, there were employed an average of 34,952 men earning in wages \$19,382,816. The total tonnage mined, chiefly coal, was 13,890,468, tons shipped 12,247,348, having a net value of \$34,405,960. In the manufacture of cement, clay products and



lime, and quarrying of stone, etc., there were employed an average of 19,004 men to whom were paid \$8,827,508 in wages, the net value of products shipped being \$22,709,611.

The total number of men engaged in the mining industry in 1911 was, therefore, over 63,000, and wages paid over \$36,000,000. These figures, as already explained, do not include the labour employed in placer gold mining nor in the production of petroleum.

### Mine Production, 1910.

	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Under-ground.	Surface.				
METALLIFEROUS ORES.	No.	No.		\$	Tons.	Tons.	\$
Iron ores.....	8	971		443,998	335,768	259,418	574,362
Milling gold ores—							
Bullion shipped.....							659,987
Concentrate.....	47	969		725,989	138,021	8,997	565,340
Silver-cobalt ores—							
Mine bullion shipped.....						35	542,034
Ore and concentrate.....	38	1,632	1,322	2,642,133	274,780	35,627	15,344,470
Nickel-copper ores.....	7	660	286	719,237	652,392	652,392	2,609,568
Copper ores.....	3	118	97	105,366	54,220	36,714	172,162
Silver-lead and zinc ores.....	48	592	282	850,416	180,070	58,418	1,668,415
Copper-gold-silver ores.....	19	1,432	487	1,872,242	1,958,591	1,924,405	7,888,306
Shipping mines not reporting:							
Silver-lead.....	12						
Copper-gold.....	9				1,994	1,994	
Placer mining—							
Yukon.....							4,550,000
British Columbia.....							540,000
Other provinces.....							1,850
Total metallic.....	191	8,839		7,359,381	3,595,836	2,978,000	35,116,494
Total non-metallic.....		36,210		22,698,000	16,148,993	13,800,989	37,757,158
Total structural material.....		17,259		7,547,000			19,627,592
Total.....		62,308		37,604,381			92,501,244

## Mine Production, 1911.

	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals, shipped.	Net value of shipments.
		Under-ground.	Sur-face.				
METALLIFEROUS ORES.	No.	No.		\$	Tons.	Tons.	\$
Iron ores.....	8	943		449,468	421,113	210,344	522,319
Milling gold ores—							
Bullion shipped.....							513,991
Concentrates.....	45	1,085		954,659	118,758	8,026	663,213
Silver-cobalt ores—							
Mine bullion shipped.....						130	2,007,440
Ore and concentrate.....	36	1,794	1,448	2,722,228	254,290	25,539	14,400,245
Nickel-copper ores.....	7	858	425	889,894	612,511	612,511	2,450,044
Copper ores.....	2	119	67	98,084	66,088	39,047	247,555
Silver-lead and zinc ores.....	40	528	297	809,862	120,323	48,660	1,186,996
Gold-copper-silver ores.....	22	1,495	563	1,933,385	1,602,247	1,486,931	7,727,696
Placer mining—							
Yukon.....							4,606,812
British Columbia.....							426,000
Other provinces.....							8,202
Total metalliferous.....	160	9,622		7,857,580	3,195,330	2,431,188	34,760,513
" non-metalliferous.....		34,952		19,382,816	13,890,468	12,247,348	34,405,960
" structural materials.....		19,004		8,827,508			22,709,611
		63,578		36,067,904			91,876,084

## SMELTER PRODUCTION.

Statistics of the production of copper and lead smelters, showing the tonnage of ore treated, the matte, blister, base bullion, or refined metal produced, etc., were collected for the first time by the Mines Branch in 1908 and were published in the report for that year. Similar returns covering each succeeding year have also been received through the courtesy of the various operating companies, a list of which follows:—

The Mond Nickel Company,	Victoria Mines, Ont.
The Canadian Copper Company,	Copper Cliff, Ont.
The Coniagas Reduction Company,	Thorold, Ont.
The Deloro Mining and Reduction Company,	Deloro, Ont.
The Canada Refining & Smelting Company, Ltd.,	Orillia, Ont.
The Consolidated Mining and Smelting Company of Canada,	Trail, B.C.
The Granby Consolidated Mining, Smelting and Power Company,	Grand Forks, B.C.
The British Columbia Copper Company, Ltd.,	Greenwood, B.C.
The Tye Copper Company, Ltd.,	Ladysmith, B.C.
The Canadian Antimony Company,	St. George, N.B.

The aggregate quantity of ore and concentrates treated in these works during 1911 was 2,193,553 tons, as compared with 2,683,714 tons in 1910, and 2,376,148 tons in 1909.

The ores may be conveniently classified as shown in the following table:—

	1909.	1910.	1911.
	Tons.	Tons.	Tons.
Nickel-copper ores.....	462,336	628,947	610,834
Silver-cobalt-nickel-arsenic ores.....	8,384	9,466	9,330
Lead and other ores treated in lead furnaces..	54,539	57,549	55,408
Copper-gold-silver ores.....	1,850,889	1,987,752	1,517,981
Total.....	2,376,148	2,683,714	2,193,553

The products obtained in Canada from the treatment of these ores include: refined lead produced at Trail, B.C., and fine gold, fine silver, copper sulphate, and antimony produced from the residues of the lead refinery; silver bullion, white arsenic, nickel oxide, and cobalt oxide produced in Ontario, from the Cobalt District ores. Refined antimony was produced in New Brunswick in 1909. In addition to these refined products, blister copper, copper matte, nickel-copper matte, cobalt material or mixed nickel and cobalt oxides are produced and exported for refining outside of Canada.

The aggregate results of smelting and refining operations may be summarized as shown in the next table. Unfortunately the figures cannot be taken to represent the total production from smelting ores mined in Canada, since considerable quantities of copper and silver ores are still shipped to other smelters outside of Canada for smelting.

It should also be explained that the figures include the results of the treatment in British Columbia of a small quantity of imported ores.

#### Smelter and Refinery Production in Canada, 1909-1910-1911.

	1909.		1910.		1911.	
	Refined products.	Metals contained in matte, blister, base bullion, and speiss.	Refined products.	Metals contained in matte, blister, and base bullion.	Refined products.	Metals contained in matte, blister, and base bullion.
Antimony.....Lbs.	61,207					
Gold.....Ozs.	18,241	200,129	13,298	197,181	15,270	175,189
Silver....."	14,242,545	4,845,920	16,373,799	2,136,414	19,078,768	585,896
Lead.....Lbs.	41,883,614	3,973,810	32,987,508		23,525,050	
Copper....."		53,328,583		56,149,299		29,855,868
Copper sulphate....."	51,405		163,228		197,187	
Nickel....."		27,041,957		37,587,676		34,098,744
Cobalt....."		1,321,083				
White arsenic....."	2,258,087		3,903,467		4,194,209	
Arsenic....."		1,074,516				

Smelter products shipped outside of Canada for refining were: blister copper, carrying gold and silver values, 10,710 tons in 1911, as compared with 13,918

tons in 1910, and 14,239 tons in 1909; copper matte carrying gold and silver values, 11,320 tons in 1911, as against 11,519 tons in 1910, and 11,597 tons in 1909; Bessemer nickel-copper matte carrying small gold and silver values as well as metals of the platinum group, 32,607 tons in 1911, as compared with 35,033 tons in 1910, and 25,845 tons in 1909; lead bullion carrying gold and silver values, 2,010 tons in 1909.

*Nickel-Copper Ores.*—The smelters of the Canadian Copper Company at Copper Cliff and the Mond Nickel Company at Victoria Mines treat the nickel-copper ores of the district. These ores consist of pyrrhotite and chalcopyrite, the nickel being chiefly contained in the mineral pentlandite disseminated through the ore. The greater part of the ore is roasted in open heaps.

In 1909 the quantity of ore mined was 451,892 tons, while the quantity smelted was 462,336 tons. The quantity of Bessemer matte produced was 25,845 tons, containing 7,873 tons of copper and 13,141 tons of nickel.

In 1910 the total quantity of ore mined was 652,392 tons, while the quantity smelted was 628,947 tons. The quantity of Bessemer matte produced was 35,033 tons, containing 9,630 tons of copper and 18,636 tons of nickel.

In 1911 the total quantity of ore mined was 612,511 tons, while the quantity smelted was 610,834 tons. The quantity of Bessemer matte produced was 32,607 tons, containing 8,966 tons of copper and 17,049 tons of nickel.

Statistics of smelter production from these ores are available since the commencement of the industry and are shown in the following table:—

#### Smelter Production of the Nickel-Copper Ores of the Sudbury District.

Calendar Year.	Ore mined.	Ore smelted.	Matte shipped.	Value matte.	Nickel content of matte.	Copper content of matte.
	Tons.	Tons.	Tons.	\$	Tons.	Tons.
1886.....	3,307	30,000			900	1,500
1887.....	567					
1888.....						
1889.....	44,990	40,146	3,274		432	733
1890.....					718	651
1891.....	83,300	72,558	10,336		2,018	2,064
1892.....	74,381	57,022			1,207	1,102
1893.....			9,425		1,991	1,821
1894.....	103,223	96,038	11,681	766,422	2,454	2,604
1895.....	74,135	68,618	10,188	890,831	1,944	2,288
1896.....	94,966	71,027	10,759	416,594	1,699	1,584
1897.....	93,154	96,370	13,968		1,999	2,750
1898.....	123,820	121,924			2,759	4,187
1899.....	159,957	172,761		702,341	2,872	2,834
1900.....	196,420		23,336	1,076,306	3,540	3,364
1901.....	315,692	255,958		1,661,839	4,594	4,318
1902.....	269,538	211,847	25,311	1,327,448	5,347	3,553
1903.....	136,033	207,030	13,832	2,686,469	6,253	3,576
1904.....	203,388	118,470	10,154	2,193,198	5,274	2,455
1905.....	277,766	251,421	17,405	4,019,814	9,438	4,386
1906.....	343,814	340,059	20,310	4,628,011	10,745	5,264
1907.....	351,916	359,076	22,025	3,289,382	10,595	6,996
1908.....	409,551	360,180	21,210	2,930,989	9,572	7,503
1909.....	451,892	462,336	25,845	3,913,012	13,141	7,873
1910.....	652,392	628,947	35,033	5,380,064	18,636	9,630
1911.....	612,511	610,834	32,607	4,945,593	17,049	8,966



*Silver-Cobalt-Nickel-Arsenic Ores.*—The rich silver ores of the Cobalt district, the first shipments of which were made in 1904, are still to a large extent shipped out of Canada, even for first treatment.

Four Canadian smelters are treating these ores, and silver bullion, white arsenic, and nickel and cobalt oxides and mixed oxides or cobalt material are being recovered.

The Canadian Copper Company in 1906 established works for the treatment of these ores at Copper Cliff at which silver bullion, white arsenic, and cobalt material are recovered. The Coniagas Reduction Company built a plant at Thorold, Ont., in 1908, for the treatment of the ores of the Coniagas mine and also custom ore, the Deloro Mining and Reduction Company established works at Deloro, Ont., and in 1911 the Canada Refining and Smelting Company, Ltd., completed and placed in operation a plant at Orillia, Ont., for the treatment of cobalt silver ores. At each of these plants, nickel and cobalt oxides are recovered in addition to silver bullion and white arsenic.

The treatment of these ores in Ontario in 1909, 1910, and 1911 gives the following results:—

		1909.	1910.	1911.
Ore treated.....	Tons.	8,384	9,466	9,330
Products recovered:—				
Silver produced†.....	Ozs.	12,239,542	14,574,839	17,753,167
White arsenic.....	Lbs.	2,258,087	3,003,467	4,194,209
Speiss or residues.....	Tons.	2,660	3,074	.....
Cobalt oxide and nickel oxide.....	Lbs.	.....	13,508	154,174
Mixed cobalt and nickel oxides and cobalt material.....	"	.....	108,178	1,260,832

† Fine ounces contained in silver bullion, fineness ranging from 850 to 998.

*Lead Ores.*—There was only one lead smelting plant in operation in Canada in 1911, viz.: that at Trail, B.C., operated by the Consolidated Mining and Smelting Company of Canada, Limited. This smelter is supplemented by a lead refinery employing the Betts Electrolytic Process and having a capacity of 100 tons per day. The main ore supply has come from the St. Eugene and Sullivan mines owned by the same Company, though practically all the lead ore produced in the Slocan district is smelted as customs ore. Supplementing the lead ores is a small tonnage of gold and silver ores, with some gold concentrates from stamp mills.

In the refinery, the bullion from the smelter is cast into anodes and re-deposited electrolytically upon cathode starting sheets of refined lead. The refined lead is cast into pigs of 100 pounds and 180 pounds weight, the latter being a special form for the Chinese trade.

The slimes from the tank room carry gold, silver, antimony, arsenic, and copper. The first two are recovered as fine metals, and the copper as copper sulphate.



Antimony is recovered, though not regularly, and bearing metal is manufactured.

The annual production of refined lead, fine gold and silver, and of copper sulphate has been as follows:—

Calendar Year.	Refined lead.	Fine gold.	Fine silver.	Copper sulphate.
	Lbs.	Ozs.	Lbs.	Lbs.
1904.....	7,519,440	4,336	551,450	56,000
1905.....	15,804,509	8,602	1,088,328	77,175
1906.....	20,471,314	9,993	1,263,809	143,135
1907.....	26,607,461	10,395	1,631,422	97,751
1908.....	36,549,274	15,346	1,956,039	203,379
1909.....	41,883,614	18,241	2,003,003	51,405
1910.....	32,987,508	13,298	1,798,960	163,228
1911.....	23,525,050	15,270	1,325,601	197,187

*Gold-Silver-Copper Ores of British Columbia.*—There are four copper smelters in British Columbia and one smelter at Tacoma, Wash., U.S.A., treating these complex ores.

The ores of the Rossland camp, of which gold is the chief constituent value, are smelted in the Trail copper furnace of the Consolidated Mining and Smelting Company. The low grade copper ores of the Boundary district are smelted locally at Grand Forks and Greenwood, some also going to Trail.

On the coast the ores of this class are smelted at Ladysmith, but a considerable tonnage is also shipped to the United States for treatment, while the local smelters are receiving some foreign ores. The Crofton smelter, which has not been in operation during the past four years, is owned by the Britannia Copper Syndicate, Limited. The Boundary Falls smelter has been largely dismantled.

The aggregate production of the Canadian smelters in 1909, 1910, and 1911, including the foreign ores treated, was as follows:—

	1909.	1910.	1911.
Ore smelted..... Tons.	1,850,889	1,987,752	1,517,981
Smelter products—			
Matte..... "	11,597	11,519	11,320
Blister..... "	14,239	13,918	10,710
Metallic content of matte and blister—			
Gold..... Ozs.	198,898	197,181	175,189
Silver..... "	612,164	636,140	585,896
Copper..... Lbs.	37,581,884	36,890,283	29,855,868

*Trail Smelter.*—Statistics of the production of the Trail smelter, including both the copper and lead smelters, have been published in the annual reports of the Company, the figures since 1906 having been as follows:—

## Production of Trail Smelter.

Year ending June 30.	Ore smelted.	METALS CONTAINED IN MATTE AND BULLION PRODUCED.			
		Gold.	Silver.	Lead.	Copper.
	Tons.	Ozs.	Ozs.	Lbs.	Lbs.
1906 (6 mos. only).....	157,640	64,590	1,074,255	15,133,683	2,399,161
1907.....	222,573	69,168	1,100,271	20,383,083	3,443,310
1908.....	305,956	121,380	2,224,888	32,157,139	4,004,468
1909.....	347,417	114,920	2,443,475	43,675,077	4,637,631
1910.....	487,125	137,614	2,162,406	42,368,816	5,974,959
1911.....	388,785	119,067	1,458,758	24,026,015	4,421,988
1912.....	296,458	129,789	1,765,992	26,072,074	2,914,141
Production from 1894 to June, 1912.....	3,143,927	1,146,912	20,224,623	250,970,644	50,789,983

*Granby Smelter.*—The smelting plants of the Boundary district are of particular interest on account of the low grade ore treated. These ores vary from 1 to 3 per cent in copper, from \$1 to \$3 in gold and silver, and about 1,000,000 tons are now annually smelted. There are two smelters in the district, the larger being that at Grand Forks, operated by the Granby Consolidated Mining, Smelting, and Power Company. The first furnace, of 300 tons capacity, was completed in 1900, and since that date the capacity of the plant has been increased, from time to time, until at present there are eight furnaces with a capacity of about 4,500 tons per day. The converter plant, which was first installed in 1902, was enlarged in 1909, the new plant being claimed by the Company to have a capacity of 40,000,000 pounds per year.

The quantities of ores smelted and the total production of metals, shown in the next table, are as published in the Annual Report of the Company for the year ending June 30, 1911.

### Ore Smelted and Metals Recovered at Granby Smelter.

Year ending June 30.	ALL MATERIAL SMELTED.				METALS PRODUCED.		
	Granby ore.	Foreign.		Total.	Gold.	Silver.	Copper.
		Ore.	Matte.				
Tons.	Tons.	Tons.	Tons.	Ozs.	Ozs.	Lbs.	
1901.....	169,087	7,832	.....	176,919	8,871	34,990	5,435,955
1902.....	293,645	4,454	3,001	301,100	30,786	274,511	10,836,851
1903.....	289,583	7,691	6,223	303,497	35,121	277,574	12,551,758
1904.....	516,059	36,182	4,290	556,531	54,493	275,935	16,020,986
1905.....	550,738	39,382	.....	590,120	42,980	215,449	14,224,692
1906.....	796,188	36,158	.....	832,346	50,020	316,947	19,939,004
1907.....	649,022	16,893	.....	665,915	32,738	201,337	16,410,576
1908.....	858,432	24,179	.....	882,611	40,068	300,204	21,092,288
1909.....	964,789	19,944	.....	984,733	45,760	335,520	21,901,528
1910.....	1,175,548	21,829	.....	1,197,377	48,752	356,746	22,754,899
1911.....	959,563	24,783	.....	984,346	41,707	343,178	17,858,860
1912.....	721,719	17,800	.....	739,519	33,932	225,305	13,231,121
Total.....	7,944,373	257,127	13,514	8,215,014	465,228	3,157,696	192,358,518

*Greenwood Smelter.*—At this plant, owned by the British Columbia Copper Company, there are three large furnaces having a total daily capacity of from 2,400 to 2,500 tons per day.

In the Annual Report of the Company for the year ending November 30, 1911, the Acting General Manager, the Late Mr. E. G. Warren, refers to the smelting operations as follows:—

#### “ The Smelter.

“There were handled at the smelter during the year exclusive of coke, 608,945 tons of ore segregated as follows:—

B.C. Copper Co. Ores.....	385,829 tons.
Custom Ores.....	212,927 “
Converter Slag.....	10,189 “
	608,945 “

“Included in the item of the converter slag was 5,679 tons of custom ore and clay.

“The blister production amounted to 10,044,093 pounds containing:—

Fine Copper.....	9,944,987 lbs.
Gold.....	31,144 ozs
Silver.....	134,266 “

"On March 31 a strike was declared in the Crowsnest Pass Coal District entirely shutting off the Company's supply of coke from those fields and forcing us into the Connellsville market to prevent a suspension of operations. There were imported from Pennsylvania 41,500 tons of coke at an increased cost of \$150,000 over the cost of the same tonnage of local coke."

"Apart from the use of foreign coke and the attendant inconveniences brought about through its irregular delivery, smelting operations were normal and the largest tonnages and copper production were made in the Company's history."

"Since our last Annual Report options to purchase have been secured upon certain promising mineral claims as follows:—

"Copper" and "Riverside" Claims, in Franklin Camp, B.C.

"Voight Property", near Princeton, B.C.

"L.H." Claim, in Slocan district, B.C.

"Greyhound" Claim, in Deadwood Camp, B.C."

A description of the smelting works of the British Columbia Copper Company, Ltd., at Greenwood, B.C., by the consulting engineer of the Company and late General Manager, Mr. J. E. McAllister, will be found in the "Engineering and Mining Journal" of May 20, 1911.

*The Ladysmith Smelter.*—This smelter is owned and operated by the Tyee Copper Company, and was the only Canadian smelter in operation on the coast during the last four years. Both domestic and imported ores are treated, but the Company has not published details of its smelter operations.

At Observatory inlet, Portland canal, the Granby Consolidated Mining, Smelting, and Power Company have under construction a smelter to treat the ores from their Hidden Creek property and also custom ores.

## METALLIC PRODUCTS.

### COPPER.

The total production of copper in Canada in 1911, estimated on the basis of smelter recovery from ores treated, was 55,648,011 pounds, which at the average price of copper for the year in New York, 12.376 cents per pound, would be worth \$6,886,998.

The copper production in 1910, compiled on a similar basis, was estimated at 55,692,369 pounds, showing a slight decrease in production in 1911. The average New York price for copper in 1910 was 12.738 cents, the decrease in price being 0.362 cents or 2.8 per cent.

In the Province of British Columbia the copper production is mainly derived from ores carrying a very low content of copper metal. In the smelting of these ores the copper losses in slag are quite considerable, reaching as high, in some cases, as 25 per cent or more, of the copper content of the ore. With ores of this character there is, therefore, a wide difference between the copper content of ore shipped from the mine and the copper metal recovered by the smelters.

The statistics of copper production for the years previous to 1909 as given in Tables 1 and 2 include for British Columbia a record of the copper production in that Province as collected by the Provincial Bureau of Mines. These are compiled on the basis of the total metal content of the ores sent to smelters for which smelter returns were received during the year, and these show a relatively higher copper production than the figures published by the Province of Ontario, which are based on copper content of matte produced.

The independent collection of statistics on smelter production by the Mines Branch—through the courtesy of the smelter operators—has made possible the compilation and publication of statistics of production based on smelter recoveries as given above; thus providing for a more equitable comparison of the production of the several provinces, and the production of Canada generally, with other countries.



## COPPER.—TABLE 1.

## Production by Provinces 1909, 1910, and 1911.

Provinces.	1909.†		1910.		1911.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value
		\$		\$		\$
Quebec.....	1,088,212	141,272	877,347	111,757	2,436,190	301,503
Ontario.....	15,746,699	2,044,237	19,259,016	2,453,213	17,932,263	2,219,297
British Columbia...	35,658,952	4,629,245	35,270,006	4,492,693	35,279,558	4,366,198
Other districts*....	.....	.....	286,000	36,431	‡	.....
Total.....	52,493,862	6,814,754	55,692,369	7,094,094	55,648,011	6,886,998

\* Includes Nova Scotia and Yukon.

† The apparently large decrease in British Columbia copper production in 1909 as compared with 1908 is mainly due to the different basis of compilation adopted in 1909, for explanation of which see the text. The British Columbia copper production in 1909 based on copper content of ores sent to smelters was 45,597,245 pounds. (See Tables 8 and 9).

‡ A shipment is reported from New Brunswick.

With the exception of a small output of copper sulphate at Trail, B.C., the copper production of Canada is practically all exported. The exports of copper in ore, matte, regulus, etc., from Canada during the calendar year, 1911, are reported by the Customs Department as 55,208,054 pounds, of which 49,202,456 pounds were exported to the United States, and 6,003,818 pounds to Great Britain.

The exports in 1910 were recorded as 56,964,127 pounds. These figures agree fairly closely with the statistics of smelter recovery.

*Prices.*—The average monthly prices in cents per pound of electrolytic copper in New York are shown for a period of five years in the accompanying table.

## Monthly Average Prices of Electrolytic Copper in New York.

Months.	1907.	1908.	1909.	1910.	1911.
	Cts.	Cts.	Cts.	Cts.	Cts.
January .....	24·404	13·726	13·893	13·620	12·295
February .....	24·869	12·905	12·949	13·332	12·256
March.....	25·065	12·704	12·387	13·255	12·139
April.....	24·224	12·743	12·563	12·733	12·019
May.....	24·048	12·598	12·893	12·550	11·989
June.....	22·665	12·675	13·214	12·404	12·385
July.....	21·130	12·702	12·880	12·215	12·463
August.....	18·356	13·462	13·007	12·490	12·405
September .....	15·565	13·388	12·870	12·379	12·201
October.....	13·169	13·354	12·700	12·553	12·189
November.....	13·891	14·130	13·125	12·742	12·616
December .....	13·163	14·111	13·298	12·581	13·552
Yearly average....	20·004	13·208	12·982	12·738	12·376

In London, the monthly average prices of standard copper were as shown hereunder in £ per ton of 2,240 pounds.

# Monthly Average Prices of Standard Copper in London.

Months.	1907.	1908.	1909.	1910.	1911.
	£	£	£	£	£
January.....	106·739	62·386	57·688	60·923	55·604
February.....	107·356	58·786	61·197	59·388	54·970
March.....	106·594	58·761	56·231	59·214	54·704
April.....	98·625	58·381	57·363	57·238	54·035
May.....	102·375	57·387	59·338	56·313	54·313
June.....	97·272	57·842	59·627	55·310	56·368
July.....	95·010	57·989	58·556	54·194	56·670
August.....	79·679	60·500	59·393	55·733	56·264
September.....	68·375	60·388	59·021	55·207	55·253
October.....	60·717	60·139	57·551	56·722	55·176
November.....	61·226	63·417	58·917	57·634	57·253
December.....	60·113	62·943	59·906	56·069	62·063
Yearly average.....	87·007	59·902	58·732	57·054	55·973

The price of copper in New York varied between 13½ cents per pound in December and a minimum of 11 cents in May.

Statistics showing the annual copper production in Canada since 1886 are given in Table 2, which shows the yearly increase or decrease, as the case may be, and also the yearly price per pound in New York.

COPPER.—TABLE 2.

## Annual Production.

Calendar Year.	Lbs.	Increase or decrease.		Value.	Increase or decrease.		Average price per pound.
		Lbs.	%		\$	%	
				\$			Cts.
1886.....	3,505,000			385,550			11·00
1887.....	3,260,424	(d) 244,576	6·99	366,798	(d) 18,752	4·86	11·25
1888.....	5,562,864	2,302,440	70·60	927,107	560,309	152·70	16·66
1889.....	6,809,752	1,246,888	22·40	936,341	9,234	0·99	13·75
1890.....	6,013,671	(d) 796,081	11·69	947,153	10,812	1·15	15·75
1891.....	9,529,401	3,515,730	58·46	1,226,703	279,550	29·51	12·87
1892.....	7,087,275	2,442,126	25·63	818,580	(d) 408,123	33·27	11·55
1893.....	8,109,856	1,022,381	14·40	871,809	53,229	6·50	10·75
1894.....	7,708,789	(d) 401,067	4·94	736,960	(d) 134,849	15·46	9·56
1895.....	7,771,639	62,850	0·81	836,228	99,268	13·47	10·76
1896.....	9,393,012	1,621,373	20·86	1,021,960	185,732	22·21	10·88
1897.....	13,300,802	3,907,790	41·60	1,501,660	479,700	46·94	11·29
1898.....	17,747,136	4,446,334	33·43	2,134,980	633,320	42·17	12·03
1899.....	15,078,475	(d) 2,668,661	15·04	2,655,319	520,339	24·37	17·61
1900.....	18,937,138	3,858,663	25·59	3,065,922	410,603	15·46	16·19
1901.....	37,827,019	18,889,881	99·75	6,096,581	3,030,659	98·84	16·117
1902.....	38,804,259	977,240	2·58	4,511,383	(d) 1,585,198	26·00	11·626
1903.....	42,684,454	3,880,195	10·00	5,649,487	1,138,104	25·23	13·235
1904.....	41,383,722	(d) 1,300,732	3·05	5,306,635	(d) 342,852	6·07	12·823
1905.....	48,092,753	6,709,031	16·21	7,497,660	2,191,025	41·29	15·590
1906.....	55,609,888	7,517,135	15·63	10,720,474	3,222,814	42·98	19·278
1907.....	56,979,205	1,369,317	2·46	11,398,120	677,654	6·32	20·004
1908.....	63,702,873	6,723,668	11·80	8,413,876	2,984,244	26·18	13·208
1909*	52,493,863			6,814,754			12·982
1910.....	55,692,369	3,198,506	6·09	7,094,094	279,340	4·10	12·738
1911.....	55,648,011	(d) 44,358	0·79	6,886,998	(d) 207,096	2·92	12·376

\* The decrease is not as large as the figures would indicate because of the calculation of part of the 1909 production on a different basis from previous years. (See explanation in text).

Statistics of the exports of copper as collected by the Customs Department are shown in Table 3, and statistics of imports in Tables 4 and 5. The total imports of copper in so far as weights are given, amounted during the fiscal year ending March, 1911, to 30,586,768 pounds. During the calendar year, 1911, the total imports were valued at \$4,936,769, and included crude and manufactured copper to the extent of 37,352,237 pounds, valued at \$4,721,480, together with other copper manufactures valued at \$215,289, of which the quantity is not stated. In detail these imports comprise crude copper (pigs, ingots, scrap, blocks, etc.), 8,112,387 pounds, valued at \$823,374; copper in bars, rods, coils, etc., 25,495,400 pounds, valued at \$3,272,478; copper in strips, sheets or plates, 2,826,100 pounds, valued at \$434,574; copper tubing, etc., 562,826 pounds, valued at \$113,949; and copper wire, 355,524 pounds, valued at \$77,105.

## COPPER.—TABLE 3.

## Exports of Copper in Ore, Matte, etc.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1885.....		262,600	1899.....	11,371,766	1,199,908
1886.....		249,259	1900.....	23,631,523	1,741,885
1887.....		137,966	1901.....	32,488,872	3,404,908
1888.....		257,260	1902.....	26,094,498	2,476,516
1889.....		168,457	1903.....	38,364,676	3,873,827
1890.....		398,497	1904.....	38,553,282	4,216,214
1891.....		348,104	1905.....	40,740,861	5,443,873
1892.....		277,632	1906.....	42,398,538	7,303,366
1893.....	4,792,201	269,160	1907.....	54,688,450	8,749,609
1894.....	1,625,389	91,917	1908.....	51,136,371	5,934,559
1895.....	3,742,352	236,965	1909.....	54,447,750	5,832,246
1896.....	5,462,052	281,070	1910.....	56,964,127	5,840,553
1897.....	14,022,610	850,336	1911*.....	55,208,051	5,459,770
1898.....	11,572,381	840,243			

\* Also 7,656 pounds \$7,955, black or coarse and in pigs.

## COPPER.—TABLE 4.

## Imports of Pigs, Old, Scrap, etc.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	31,900	2,130	1896.....	86,905	9,226
1881.....	9,800	1,157	1897.....	49,000	5,449
1882.....	20,200	1,984	1898.....	1,050,000	80,000
1883.....	124,500	20,273	1899.....	1,655,000	246,740
1884.....	40,200	3,180	1900.....	1,144,000	180,990
1885.....	28,600	2,016	1901.....	951,500	152,274
1886.....	32,000	6,969	1902.....	1,767,200	325,852
1887.....	40,100	2,507	1903.....	2,038,400	252,594
1888.....	32,300	2,322	1904.....	2,115,300	270,315
1889.....	32,300	3,288	1905.....	1,944,400	266,548
1890.....	112,200	11,521	1906.....	2,627,700	441,854
1891.....	107,800	10,452	1907. (9 mos.).....	2,616,600	520,971
1892.....	343,600	14,894	1908.....	3,612,400	650,597
1893.....	168,300	16,331	1909.....	2,732,300	383,441
1894.....	101,200	7,397	1910.....	4,690,700	617,630
1895.....	72,062	6,770	1911.....	5,023,700	641,749
1911 { Copper, old and scrap or in blocks..... Duty free.				366,900	41,128
{ Copper in pigs or ingots..... Duty free.				4,656,800	600,621
Total .....				5,023,700	641,749

## COPPER.—TABLE 5.

## Imports of Manufactures.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	123,061	1891.....	563,522	1902.....	1,281,522
1881.....	159,163	1892.....	422,870	1903.....	1,291,635
1882.....	220,235	1893.....	458,715	1904.....	1,191,610
1883.....	247,141	1894.....	175,404	1905.....	1,775,881
1884.....	134,534	1895.....	251,615	1906.....	2,660,303
1885.....	181,469	1896.....	285,220	1907 (9 mos).....	2,545,600
1886.....	219,420	1897.....	264,587	1908.....	2,713,060
1887.....	325,365	1898.....	786,529	1909.....	2,086,205
1888.....	303,459	1899.....	551,586	1910.....	2,870,630
1889.....	402,216	1900.....	1,090,280	1911.....	3,742,940
1890.....	472,668	1901.....	551,045		

COPPER.—TABLE 5—*Continued.*

## Imports of Manufactures.

		Duty.	Lbs.	Value.
1911.	Copper in bars and rods, in coils, or otherwise, in lengths not less than 6 feet, unmanufactured....	Free.	21,396,800	\$ 2,845,060
	Copper, in strips, sheets or plates, not planished or coated, etc. ....	"	3,372,800	536,862
	Copper tubing in lengths not less than 6 feet, and not polished, bent or otherwise manufactured ...	"	517,911	106,416
	Copper rollers, for use in calico printing .....	"		20,361
	Copper and manufactures of:—			
	Nails, tacks, rivets and burrs or washers. ....	30 %		2,158
	Wire, plain, tinned or plated .....	15 "	275,557	64,720
	Wire cloth, etc. ....	25 "		7,175
	All other manufactures of, N.O.P. ....	30 "		160,188
	Total. ....			3,742,940

## Nova Scotia.

No copper was produced during the year, development work only being done.

## New Brunswick.

A small shipment is reported from this Province.

## Quebec.

The copper production of Quebec was as usual from the pyritic ores of the Eastern Townships. There was a large increase over 1910, the copper production for 1911 being 2,436,190 pounds, valued at \$301,503, representing the estimated recovery from 39,122 tons of ore and concentrates shipped containing some 3,123,189 pounds of copper.

Statistics of the copper production in this Province since 1886 are shown in Table 6.

COPPER.—TABLE 6.

## Quebec:—Production.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1886 .....	3,340,000	367,400	1899 .....	1,632,560	287,494
1887 .....	2,937,900	330,514	1900 .....	2,220,000	359,418
1888 .....	5,562,864	927,107	1901 .....	1,527,442	246,178
1889 .....	5,315,000	730,813	1902 .....	1,640,000	190,666
1890 .....	4,710,606	741,920	1903 .....	1,152,000	152,467
1891 .....	5,401,704	695,469	1904 .....	1,760,000	97,455
1892 .....	4,883,480	564,042	1905 .....	621,243	252,752
1893 .....	4,468,352	480,348	1906 .....	1,981,169	381,930
1894 .....	2,176,430	208,067	1907 .....	1,517,990	303,659
1895 .....	2,242,462	241,288	1908 .....	1,282,024	169,330
1896 .....	2,407,206	261,903	1909 .....	1,088,212	141,272
1897 .....	2,474,970	279,424	1910 .....	877,347	111,757
1898 .....	2,100,235	252,658	1911 .....	2,436,190	301,503



## Ontario.

There is as yet comparatively little copper production in this Province besides that obtained from the nickel-copper ores of the Sudbury district. In 1911, productive operations were carried on by the Canadian Copper Company at the Creighton and Crean Hill mines, and by the Mond Nickel Company at Victoria mines.

The Ontario Government pays a bounty on copper over 95 per cent pure metal and on copper sulphate, produced from ore mined and refined in the Province. The text of the Act will be found in the chapter on cobalt under the heading 'Metal Refining Bounty Act.'

The total production of nickel-copper ore in 1911 was 610,834 tons. There were produced during the year 32,607 tons of Bessemer matte, containing 8,966 tons of copper and 17,049 tons of nickel, the shipping value of the matte being approximately \$4,945,592.

Details of the production from these ores are given more completely, and in tabular form in the article on nickel, and also under smelter production. Statistics of the copper production of Ontario since 1886 are given in Table 7.

COPPER.—TABLE 7.

## Ontario:—Production.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1886.....	165,000	18,150	1899.....	5,723,324	1,007,877
1887.....	322,524	36,284	1900.....	6,740,058	1,091,215
1888.....	Nil	Nil.	1901.....	8,695,831	1,401,507
1889.....	1,466,752	201,678	1902.....	7,408,202	861,278
1890.....	1,303,065	205,233	1903.....	7,172,533	949,285
1891.....	4,127,697	531,234	1904.....	4,913,594	630,070
1892.....	2,203,795	254,538	1905.....	8,779,259	1,368,686
1893.....	3,641,504	391,461	1906.....	10,638,231	2,050,838
1894.....	5,207,679	497,854	1907.....	14,104,337	2,821,432
1895.....	4,576,337	492,414	1908.....	15,005,171	1,981,883
1896.....	3,167,256	344,598	1909.....	15,746,699	2,044,237
1897.....	5,500,652	621,023	1910.....	19,259,016	2,453,213
1898.....	8,375,223	1,007,539	1911.....	17,932,263	2,219,297

## British Columbia.

According to the returns received from smelters, the total quantity of copper contained in matte, blister, and copper sulphate produced in British Columbia smelters during 1911, and including an estimate of smelter recovery for the copper ores exported, was 35,279,558 pounds, after deducting the amount of copper produced from foreign ores. The production in 1910 on a similar basis was 35,270,006 pounds, and in 1909, 35,658,952 pounds. Returns of smelter pro-

duction in this Province were not collected by this Department previous to 1908, and a complete record of statistics of production on this basis is not available.

The production of copper in this Province according to statistics collected and published by the Provincial Department of Mines, reached a total of 36,927,656 pounds in 1911, as compared with 38,243,934 pounds in 1910. Statistics of the annual production since 1894, as ascertained by the Provincial Department of Mines, are shown in Table 8, and by districts since 1906, in Table 9.

According to direct returns in 1911, the ores of the Boundary district produced about 58.2 per cent of the total, the Rossland mines about 10.4 per cent, and the Coast district 31.4 per cent.

COPPER.—TABLE 8.

British Columbia:—Copper Content of Ores Shipped.†

Calendar Year.	Copper contained in ores, 'shipped.	Increase.		Value.
	Lbs.	Lbs.	%	
				\$
1894	324,680			31,039
1895	952,840	628,160	193.00	102,526
1896	3,818,556	2,865,716	301.00	415,459
1897	5,325,180	1,506,624	39.00	601,213
1898	7,271,678	1,946,498	36.00	874,783
1899	7,722,591	450,913	6.00	1,359,948
1900	9,977,080	2,254,489	29.00	1,615,289
1901	27,603,746	17,626,666	177.00	4,448,890
1902	29,636,057	2,032,311	7.00	3,445,488
1903	34,359,321	4,723,864	16.00	4,547,735
1904	35,710,128	1,350,207	3.7	4,579,110
1905	37,692,251	1,982,123	5.6	5,876,222
1906	42,990,488	5,298,237	14.1	8,287,706
1907	40,832,720	*2,157,768	*5.02	8,168,177
1908	47,274,614	6,441,894	15.8	6,244,031
1909	45,597,245	*1,677,369	*3.6	5,918,522
1910†	38,243,934			4,871,512
1911†	36,927,656	*1,316,278	*3.4	4,571,644

\* Decrease. † As published by British Columbia Bureau of Mines. ‡ Allowing 5 pound copper per ton for smelter losses.

COPPER.—TABLE 9.

## British Columbia:—Production\* by Districts.

	1906.	1907.	1908.	1909.	1910.†	†1911.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Cassiar .....	293,269	674,887	490,873	137,651	.....	19,151
East Kootenay.....	6,910	.....	.....	.....	.....	.....
West Kootenay—						
Nelson.....	216,034	434,222	53,243	186,572	231,936	.....
Slocan .....	2,861	.....	.....	.....	.....	.....
Trail Creek.....	4,750,110	5,080,275	5,042,244	3,509,909	3,577,745	3,429,702
All other.....	1,145	.....	.....	.....	.....	.....
Yale—						
Boundary.....	32,226,782	31,521,550	40,178,521	40,603,042	31,354,985	22,327,359
Ashcroft .....	355,377	38,706	3,269	.....	1,178	152,723
Kamloops } .....	.....	.....	.....	.....	.....	.....
Coast districts.....	5,138,000	3,083,080	1,506,464	1,160,071	3,078,090	10,998,721
Total.....	42,990,488	40,832,720	47,274,614	45,597,245	38,243,934	36,927,656

\* Copper content of ores shipped. † After deducting five pounds of copper per ton of ore for slag losses.

The low grade ores of the Boundary district, in addition to being self-fluxing, are remarkably uniform in character, ranging from 1 to 2 per cent in copper, and from \$1 to \$2 in gold and silver. In this district the greater part of the production has been obtained from the properties of the four principal companies: The Granby Consolidated Mining, Smelting, and Power Company, Limited; The British Columbia Copper Company, Limited; The Consolidated Mining and Smelting Company of Canada, Limited, and the New Dominion Copper Company, Limited. The last named is controlled by the British Columbia Copper Company. The first three Companies operated their own smelters, and the first two convert their matte into blister copper.

The approximate ore shipments during 1911, and the total shipments of the chief producers to the end of 1911, were as follows:—

	1911.	Total.
Granby Consolidated Mining, Smelting & Power Co., Ltd.....	905,880	7,415,880
British Columbia Copper Co., Ltd.....	366,485	2,751,485
Dominion Copper Co., Ltd..	182,697	831,697
Consolidated Mining and Smelting Co., of Canada, Ltd.....	30,000	613,000

The Granby Company's mines at Phoenix are equipped for a daily output of about 5,000 tons. At the Company's smelter at Grand Forks, about 630,000 tons of ore were treated during the year 1911, producing about 11,400,000 pounds of copper.

The large falling off was due to the strike among the miners of the Crowsnest Pass coal district, causing a cessation of fuel supply, and though an attempt was made to secure eastern coke, it was found too costly and the Granby smelter was, therefore, closed for nearly five months of the year. The other smelters were

also adversely affected. The chief mines shipping were: the Granby mines; the Mother Lode, Emma, and Wellington of the British Columbia Copper Co.; the Rawhide and Athelstan of the New Dominion Copper Co., and the Snowshoe of the Consolidated Mining and Smelting Co.

Next to the Boundary, the Coast district was the most important copper producer of the year, due mainly to the greatly increased output of the Britannia and Marble Bay mines, especially of the former.

Rosslund's gold-copper ores, though most valuable for their gold content, form another important source of the copper supply of the Province. Some shipments were also made from Kamloops. On the Coast a considerable amount of development is being carried on, the most important being on Alice arm, Observatory inlet, where the Granby Consolidated Mining, Smelting & Power Co. are doing extensive work on their Hidden Creek property, near which on Granby bay they are also erecting a smelter for their own and customs ores.

#### **Yukon District.**

No shipments of copper ores are reported from this district during 1911.

## GOLD.

*Refined Metal.*—Gold bullion is received, assayed, and purchased at the Assay Office in Vancouver, operated in connexion with this Department, the bullion being resold. The total quantity of bullion thus received during the twelve months ending December 31, 1911, was 39,069·31 ounces, being the weight after melting, valued at \$647,416.38, after deducting assay charges.

A refinery has been erected at the Royal Mint at Ottawa, and small shipments of gold have been received from different provinces, but at present the greater part of the Canadian gold finds its way to the United States refineries or to the United States Mint.

There is but one other refinery in Canada producing fine gold; that at Trail, established in 1904, operated by the Consolidated Mining and Smelting Company of Canada, Limited, the annual output of which in ounces of fine gold for the years 1904-1911 is shown below. The gold is recovered from the ores treated in the lead furnaces.

### Production of Refined Gold at Trail, B.C.

Year.	Ozs.
1904 .....	4,336
1905.....	8,602
1906.....	9,993
1907.....	10,395
1908.....	15,346
1909.....	18,241
1910.....	13,298
1911.....	15,270

*Mine Production.*—The production of gold in Canada—made up of gold derived from alluvial workings, gold obtained from the crushing of free milling quartz ores, and the gold obtained from other metalliferous ores sent to copper and lead smelters, etc.—reached a total, in 1911, of 473,159 fine ounces, valued at \$9,781,077, as compared with 493,707 fine ounces, valued at \$10,205,835, produced in 1910, a decrease of 20,548 ounces in quantity and \$424,758 in value, or 4·16 per cent.



The production by provinces in 1909, 1910, and 1911 is shown in Table 1 as follows:—

GOLD.—TABLE 1.  
Production by Provinces, 1909, 1910, and 1911.

	1909.		1910.		1911.	
	Ozs. (fine ‡)	Value.	Ozs. (fine )	Value.	Ozs. (fine ‡)	Value.
		\$		\$		\$
Nova Scotia.....	(b) 10,193	210,711	7,928	163,891	7,781	160,854
Quebec.....	(b) 193	3,990	124	2,565	(a,b) 613	12,672
Ontario.....	(b) 1,569	32,425	3,089	63,849	2,062	42,625
Alberta.....	(a) 25	525	89	1,850	10	207
British Columbia.....	(c) 250,320	5,174,579	261,886	5,403,318	238,496	4,930,145
Yukon.....	(a) 191,565	3,960,000	221,091	4,570,362	224,197	4,634,574
Totals.....	453,865	9,382,230	493,707	10,205,835	473,159	9,781,077

‡ Calculated from the value: one dollar = 0.048375 ozs.

(a) Placer gold.

(b) Gold from vein mining.

	1909.	1910.	1911.
	\$	\$	\$
(c) As follows: Gold from placer mining.....	477,000	540,000	426,000
Gold from vein mining.....	4,697,579	4,863,318	4,504,145
	5,174,579	5,403,318	4,930,145

The exact value of fine gold is  $\frac{8000}{387}$  dollars per ounce equivalent to \$20.671834. (United States Standard.)

In most cases, statistics of gold production are stated as crude bullion with value thereof. The fine ounces given in the tables in this report are calculated from the values by multiplying these by  $\frac{387}{8000}$  or 0.048375.

Of the total production in 1911, about \$5,014,207 or 51.3 per cent is to be attributed to alluvial workings, \$513,991 or 5.2 per cent derived from stamp milling, and \$4,252,879 or 43.5 per cent obtained from ores sent to the smelters. There was a general decrease in all the provinces except Quebec and Yukon, which show a gain.

Statistics of the annual gold production of Canada are shown in Table 2.

## GOLD.—TABLE 2.

## Annual Production in Canada, 1858-1911.

Calendar Year.	Ozs. (fine †)	Value.	Calendar Year.	Ozs. (fine †)	Value.
		\$			\$
1858.....	34,104	705,000	1885.....	55,575	1,148,829
1859.....	78,129	1,615,072	1886.....	70,782	1,463,196
1860.....	107,806	2,228,543	1887.....	57,460	1,187,804
1861.....	128,973	2,666,118	1888.....	53,145	1,098,610
1862.....	135,391	2,798,774	1889.....	62,653	1,295,159
1863.....	202,498	4,186,011	1890.....	55,620	1,149,776
1864.....	199,605	4,126,199	1891.....	45,018	930,614
1865.....	192,898	3,987,562	1892.....	43,905	907,601
1866.....	152,555	3,153,597	1893.....	47,243	976,603
1867.....	145,775	3,013,431	1894.....	54,600	1,128,688
1868.....	134,169	2,773,527	1895.....	100,798	2,083,674
1869.....	102,720	2,123,405	1896.....	133,262	2,754,774
1870.....	83,415	1,724,348	1897.....	291,557	6,027,016
1871.....	105,187	2,174,412	1898.....	666,386	13,775,420
1872.....	90,283	1,866,321	1899.....	1,028,529	21,261,584
1873.....	74,346	1,536,871	1900.....	1,350,057	27,908,153
1874.....	97,856	2,022,862	1901.....	1,167,216	24,128,503
1875.....	130,300	2,693,533	1902.....	1,032,161	21,336,667
1876.....	97,729	2,020,233	1903.....	911,559	18,843,590
1877.....	94,304	1,949,444	1904.....	796,374	16,462,517
1878.....	74,420	1,538,394	1905.....	684,951	14,159,195
1879.....	76,547	1,582,358	1906.....	556,415	11,502,120
1880.....	63,121	1,304,824	1907.....	405,517	8,382,780
1881.....	63,524	1,313,153	1908.....	476,112	9,842,105
1882.....	60,288	1,246,268	1909.....	453,865	9,382,230
1883.....	53,853	1,113,246	1910.....	493,707	10,205,835
1884.....	51,202	1,058,439	1911.....	473,159	9,781,077
				14,398,624	297,646,065

†Calculated from the value: One dollar=0·048375.

It will be observed that previous to 1897 the production only twice exceeded \$4,000,000, the maximum during the period being, in 1863, when the output reached \$4,186,011. The discovery in 1896 of the rich placer deposits of the Yukon, however, caused a rapid increase in the production for the next four years, a record maximum being reached in 1900, when the total was only a little less than \$28,000,000. The following year showed a falling off in the Yukon output, as did each succeeding year until 1908. The Yukon production in 1909, 1910, and 1911 has shown an increase, and the total for Canada seems to have an upward tendency, though there is a decrease in the year 1911.

## Nova Scotia.

The gold production of Nova Scotia, which is derived almost entirely from quartz ores, was 7,781 fine ounces, valued at \$160,854.

The principal operators in 1911 were:—

United Finance Co., Carleton.

Caribou Gold Mines, Caribou.

Albert Logan, Caribou.

Stillwater Mining Co., Moose River.  
 Tributors, Moose River.  
 Malcolm McLeod et al., Fifteenmile Stream.  
 H. C. Borden et al., Fifteenmile Brook.  
 Uniac Mines and Power Co., Gold River.  
 E. F. Walton, Kemptville.  
 Petpeswick Mining Co., Lake Catcha.  
 W. F. Fancy et al., Malaga.  
 Nova Scotia Gold Mines, Montagu.  
 W. A. Brennan, Oldham.  
 Tributors, Oldham.  
 New England Mining Co., Stormont.  
 Sydney Gold Mining Co., Stormont.  
 Seal Harbour Leasing Co., Stormont.  
 Boston and Goldenville Mining Co., Shiers Point.  
 West Gore Antimony Company, West Gore.  
 Dominion Leasing Co., Tangier.  
 E. E. Fraser, Mooseland.  
 Great Bras d'Or Gold Mining Co., Middle River.  
 M. J. O'Brien, Renfrew.

Statistics of the annual production since 1862 are shown in Table 3, and the production of gold by districts during the twelve months ending September 30, 1911, as collected and published by the Provincial Mines Department, in Table 4, while the total production from 1862 to 1911, by districts, according to the same authority, is shown in Table 5.

## GOLD.—TABLE 3.

## Nova Scotia:—Annual Production.

	Tons. treated.	Ozs. (fine).	Value.	Yield of gold per ton.		Tons. treated.	Ozs. (fine).	Value.	Yield of gold per ton.
			\$	\$				\$	\$
1862..	6,473	6,863	141,871	21·91	1887..	32,280	20,009	413,631	12·81
1863..	17,000	13,180	272,448	16·02	1888..	36,178	21,137	436,939	12·08
1864..	21,431	18,883	390,349	18·21	1889..	39,160	24,673	510,029	13·02
1865..	24,421	24,011	496,357	20·32	1890..	42,749	22,978	474,990	11·11
1866..	32,157	23,776	491,491	15·28	1891..	36,351	21,841	451,503	12·42
1867..	31,384	25,763	532,563	16·96	1892..	32,552	18,865	389,965	11·98
1868..	32,259	19,377	400,555	12·41	1893..	42,354	18,436	381,095	8·99
1869..	35,144	16,855	348,427	19·91	1894..	55,357	18,834	389,338	7·04
1870..	30,824	18,740	387,392	12·56	1895..	60,600	21,919	453,119	7·47
1871..	30,787	18,139	374,972	12·17	1896..	69,169	23,876	493,568	7·13
1872..	17,089	12,352	255,349	14·94	1897..	73,192	27,195	562,165	7·68
1873..	17,708	11,180	231,122	13·05	1898..	82,747	26,054	538,590	6·50
1874..	13,844	8,623	178,244	12·87	1899..	112,226	29,876	617,604	5·50
1875..	14,810	10,576	218,629	14·76	1900..	87,390	28,955	598,553	6·85
1876..	15,490	11,300	233,585	15·08	1901..	91,948	26,459	546,963	5·32
1877..	17,369	15,925	329,205	18·95	1902..	93,042	30,348	627,357	6·68
1878..	17,989	11,864	245,253	13·63	1903..	103,856	25,533	527,806	5·08
1879..	15,936	12,980	268,328	16·83	1904..	45,436	10,362	214,209	4·71
1880..	13,997	12,472	257,823	18·42	1905..	57,774	13,707	283,353	4·90
1881..	16,556	10,147	209,755	12·66	1906..	66,059	12,223	252,676	3·82
1882..	21,081	13,307	275,090	13·04	1907..	58,550	13,675	282,686	4·82
1883..	25,954	14,571	801,207	11·60	1908..	61,536	11,842	244,799	3·97
1884..	25,186	15,168	313,554	12·44	1909..	56,790	10,193	210,711	3·71
1885..	28,890	20,945	432,971	14·98	1910..	43,006	7,928	163,891	3·81
1886..	29,010	22,038	455,564	15·70	1911..	18,328	7,781	160,854	8·78

Total fine ounces gold. .... 883,737

Total value. .... \$18,268,498

## GOLD.—TABLE 4.

Nova Scotia:—District Details—Year ended September 30, 1911.

District.	Tons crushed.	Total yield of gold.			Average yield of gold per ton.		
		Ozs.	Dwts.	Grs.	Ozs.	Dwts.	Grs.
Stormont. ....	5,733	2,615	2	19	.....	9	2
Wagamatcook .....	125	23	4	.....	.....	3	17
Uniacke. ....	10	.....	2	.....	.....	.....	5
Gold River.....	49	45	4	5	.....	18	11
Caribou .....	754	850	4	18	1	2	13
Caribou (Moose River).....	561	245	5	14	.....	7	13
Tangier .....	5,202	1,746	13	.....	.....	6	17
Oldham .....	395	278	19	1	.....	14	2
Lake Catcha.....	863	320	5	8	.....	7	10
Fifteenmile Stream .....	242	155	7	.....	.....	12	20
Fifteenmile Brook.....	250	25	15	.....	.....	2	1
Kemptville.....	25	16	6	.....	.....	13	1
Carleton.....	48	36	15	2	.....	15	8
Malaga Barrens.....	233	69	14	12	.....	5	23
Montagu.....	41	24	2	.....	.....	11	8
Renfrew.....	3,493	1,527	.....	.....	.....	8	18
Shiers Point.....	14	7	6	.....	.....	10	10
Sherbrook (Mortared).....	.....	3	9	.....	.....	.....	.....
	18,128	7,990	15	7	.....	8	20
West Gore (Gold in concent- rates).....	191	398	16	21	2	1	18
	18,319	8,389	12	4	.....	9	4



## GOLD.—TABLE 5.

## Nova Scotia:—Production of Gold from 1862 to 1911.

District.	Tons crushed.	Total yield of gold.			Average yield of gold.			Value at \$19 per oz.	
		Ozs.	Dwts.	Grs.	Ozs.	Dwts.	Grs.	\$	
*Caribou and Moose River.	217,647	58,881	3	6	.....	5	9	118,742	
Montagu.....	29,523	42,173	3	6	1	8	14	801,290	
Oldham.....	58,421	67,215	17	22	1	3	.....	1,277,102	
Renfrew.....	58,411	47,325	17	19	.....	16	5	899,192	
Sherbrooke.....	300,213	153,090	1	4	.....	10	5	2,908,711	
Stormont.....	520,974	119,743	15	13	.....	4	14	2,275,132	
Tangier.....	60,262	27,069	6	19	.....	9	.....	514,317	
†Uniake.....	63,341	43,982	19	17	.....	13	21	835,677	
Waverly.....	155,520	69,980	10	16	.....	9	0	1,329,630	
Brookfield.....	93,527	38,709	2	2	.....	8	7	735,473	
‡ Salmon River.....	118,819	41,852	5	20	.....	7	1	795,193	
Whiteburn.....	6,907	9,800	0	2	1	8	9	186,200	
§ Lake Catcha.....	28,065	27,306	11	17	.....	19	11	518,825	
¶ Rawdon.....	12,189	9,606	5	10	.....	15	18	182,519	
Wine Harbour.....	77,396	34,992	15	11	.....	9	1	664,863	
Fifteennile Stream.....	36,878	17,362	0	5	.....	9	10	329,897	
Malaga.....	22,926	20,305	12	6	.....	17	17	385,806	
Other districts.....	142,987	74,764	17	14	.....	10	11	1,420,534	
	2,004,006	904,163	6	7	...	9	1	17,179,103	
Not included in above:	1905	527	1,232	16	23	2	6	19	23,424
gold extracted from	1906	783	1,031	13	11	1	6	8	19,602
or contained in stib-	1907	1,403	1,319	18	12	.....	18	19	25,078
nite or shipped from	1908	133	179	5	0	1	6	23	3,406
West Gore, as per	1909	.....	.....	.....	.....	.....	.....	.....	.....
returns	1910	203	350	4	15	1	14	12	6,654
	1911	191	398	16	21	2	1	18	7,578
Total .....	2,007,246	908,676	1	17	.....	9	1	17,264,845	

\* From 1869. † From 1866. ‡ From 1883. || From 1887. § From 1882. ¶ From 1887.  
|| From 1883.

The following notes with respect to operations during 1911, are taken from the report of the Provincial Department of Mines:—

"I regret to report that the amount of gold produced is the smallest since the production of the year 1862 and that the tonnage crushed is the smallest tonnage crushed since the year 1882. The direct causes of the small production of the year 1911 may be attributed to the closing down of the Richardson mine at Goldboro and the Oldham-Stirling mine at Oldham. These two mines have been in recent years the largest producers of bullion in the Province."

"Gold in this Province occurs in ore shoots or specially enriched zones in quartz veins both of the interbedded and fissure type, varying in width from one inch to several feet but usually from 2 inches to 24 inches. Carefully organized prospecting and developing operations carried on underground with strong financial backing are needed and for the individual or company that is prepared to undertake gold mining along these lines, Nova Scotia offers a promising field of operations."

## Quebec.

The production of gold reported from this Province since 1903 has been almost entirely from the pyritic ores mined at Capelton and Eustis in the Eastern Townships. Very little gold has been obtained from the alluvial deposits of the St. Francis, Chaudière, and Gilbert rivers since 1894, when the output was returned as \$29,106. However, renewed activity in the installation of hydraulic plants has raised the alluvial gold production to an amount in excess of that from lode mining.

## GOLD.—TABLE 6.

## Quebec:—Annual Production.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		\$			\$
1877.....	583	12,057	1896.....	145	3,000
1878.....	868	17,937	1897.....	44	900
1879.....	1,160	23,972	1898.....	295	6,089
1880.....	1,605	33,174	1899.....	238	4,916
1881.....	2,741	56,661	1900.....	Nil.	Nil.
1882.....	827	17,993	1901.....	145	3,000
1883.....	860	17,787	1902.....	391	8,073
1884.....	422	8,720	1903.....	180	3,712
1885.....	103	2,120	1904.....	140	2,900
1886.....	193	3,981	1905.....	191	3,940
1887.....	78	1,604	1906.....	165	3,412
1888.....	181	3,740	1907.....	Nil.	Nil.
1889.....	58	1,207	1908.....	Nil.	Nil.
1890.....	65	1,350	1909.....	193	3,990
1891.....	87	1,800	1910.....	124	2,565
1892.....	628	12,987	1911.....	613	12,672
1893.....	759	15,696			
1894.....	1,412	29,106			
1895.....	62	1,281		15,556	322,162

\* Calculated from the value: one dollar = 0.048375 ozs.

## Ontario.

The producing properties, in 1911, were:—

Cordova Mines, Ltd., Cordova mine, Peterborough Co.  
 Sturgeon Lake Development Co., St. Anthony mine, Sturgeon Lake.  
 Great Golconda Mines, Ltd., Laurentian mine, Gold Rock.  
 Kenora Mines, Ltd., Mikado mine, Kenora.  
 The Dome Mines Co., Ltd., Dome mine, Porcupine district.  
 The Hollinger Gold Mines, Ltd., Hollinger mine, Porcupine district.  
 American Eagle Mining Co., American Eagle, Porcupine district.  
 Swastika Mining Co., Ltd., Swastika mine, Porcupine district.

The past year has witnessed considerable activity in the Rainy River district. The Porcupine output would have been much greater had it not been for the fire causing such a lamentable loss of life and property. Statistics of production of gold in Ontario since 1887 are shown in Table 7, following:—

## GOLD.—TABLE 7.

## Ontario:—Annual Production.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		\$			\$
1887.....	327	6,760	1901.....	11,844	244,837
1888.....	Nil.	Nil.	1902.....	11,118	229,828
1889.....	Nil.	Nil.	1903.....	9,076	188,036
1890.....	Nil.	Nil.	1904.....	1,935	40,000
1891.....	97	2,000	1905.....	4,402	91,000
1892.....	344	7,118	1906.....	3,202	66,193
1893.....	708	14,637	1907.....	3,212	66,399
1894.....	1,917	39,624	1908.....	3,212	66,389
1895.....	3,015	62,320	1909.....	1,569	32,425
1896.....	5,563	115,000	1910.....	3,089	63,849
1897.....	9,157	189,294	1911.....	2,062	42,625
1898.....	12,863	265,889			
1899.....	20,394	421,591		123,517	2,553,309
1900.....	14,391	297,495			

\* Calculated from the value: one dollar = 0.048375 ozs.

## Alberta.

The value of gold derived from the placer deposits of the Saskatchewan river was, in 1909, \$525; in 1910, \$1,850; and in 1911, \$207.

Statistics of the production of gold from the Saskatchewan river since 1887 are shown in Table 8.

## GOLD.—TABLE 8.

## Alberta:—Annual Production.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		\$			\$
1887.....	102	2,100	1901.....	726	15,000
1888.....	58	1,200	1902.....	484	10,000
1889.....	967	20,000	1903.....	48	1,000
1890.....	193	4,000	1904.....	24	500
1891.....	266	5,500	1905.....	121	2,500
1892.....	508	10,506	1906.....	39	800
1893.....	466	9,640	1907.....	33	675
1894.....	726	15,300	1908.....	50	1,037
1895.....	2,419	50,000	1909.....	25	525
1896.....	2,661	55,000	1910.....	89	1,850
1897.....	2,419	50,000	1911.....	10	207
1898.....	1,209	25,000			
1899.....	726	15,000		14,611	302,040
1900.....	242	5,000			

\* Calculated from the value: one dollar = 0.048375 ozs.

## British Columbia.

The gold production of British Columbia in 1911, as reported to the Department, amounted to \$4,930,145, comprising placer gold \$426,000, bullion from milling ores \$310,512, smelter recoveries \$4,193,633.

The placer production is as published by the Provincial Mining Bureau. The statistics for lode gold represent as closely as can be ascertained the actual gold recovery based on smelter recoveries and bullion shipments. This production is less than that published by the Provincial Bureau of Mines, which for lode gold is based on the gold content of ores shipped to smelters, etc. According to this authority the production for 1911 was \$5,151,513, as compared with \$6,073,380 in 1910, a decrease of \$921,867.

In lode mining, there were decreases in the Nelson, Trail Creek, and Boundary districts, while there was a large increase in the Coast gold production.

In alluvial gold recovery a general decrease was shown.

Of the 1911 production, 9 per cent was from alluvial workings; 6 per cent from free milling ores, and 85 per cent from ores sent to the smelters.

Statistics of the production by districts in 1911, as published by the Provincial Department of Mines, are shown in Table 9, while the total annual production since 1858 is given in Table 10.

GOLD.—TABLE 9.

## British Columbia:—Production by Districts,\* 1911.

Districts.	GOLD PLACER.		GOLD LODGE.	
	Ozs.	Value.	Ozs.	Value.
		\$		\$
Cariboo :—				
Cariboo.....	6,800	136,000		
Quesnel.....	1,700	34,000		
Omineca.....	500	10,000		
Cassiar :—				
Atlin.....	11,250	225,000	3	62
All other.....	300	6,000	500	10,335
East Kootenay :—				
Fort Steele.....	150	3,000		
West Kootenay :—				
Ainsworth.....			4	83
Nelson.....	50	1,000	17,640	364,619
Slocan.....			47	971
Trail Creek.....			116,683	2,411,837
Othlers.....	100	2,000	57	1,178
Lilooet.....	250	5,000	71	1,467
Yale :—				
Grand Forks.....	50	1,000	87,745	1,813,690
Similkameen.....	50	1,000		
Yale.....	50	1,000	52	1,075
Coast and all others.....	50	1,000	5,815	120,196
	21,300	426,000	228,617	4,725,513

\* From Annual Report of the Minister of Mines for British Columbia.

## GOLD.—TABLE 10.

## British Columbia:—Annual Production.

Calendar Year.	Ozs. (fine†).	Value.	Calendar Year.	Ozs. (fine†).	Value.
		\$			\$
1858.....	34,104	705,000	1886.....	43,714	903,651
1859.....	73,129	1,615,072	1887.....	33,558	693,709
1860.....	107,806	2,228,543	1888.....	29,834	616,731
1861.....	128,973	2,666,118	1889.....	28,489	588,923
1862.....	128,528	2,656,903	1890.....	23,918	494,436
1863.....	189,318	3,913,563	1891.....	20,792	429,811
1864.....	180,722	3,735,850	1892.....	19,327	399,525
1865.....	168,887	3,491,205	1893.....	18,360	379,535
1866.....	128,779	2,662,106	1894.....	25,664	530,530
1867.....	120,012	2,480,868	1895.....	61,289	1,266,954
1868.....	114,792	2,372,972	1896.....	86,504	1,788,206
1869.....	85,865	1,774,978	1897.....	131,805	2,724,657
1870.....	64,675	1,336,956	1898.....	142,215	2,939,852
1871.....	87,048	1,799,440	1899.....	203,295	4,202,473
1872.....	77,931	1,610,972	1900.....	228,916	4,732,105
1873.....	63,166	1,305,749	1901.....	257,292	5,318,703
1874.....	89,233	1,844,618	1902.....	288,353	5,961,409
1875.....	119,724	2,474,904	1903.....	284,108	5,873,036
1876.....	86,429	1,786,648	1904.....	275,975	5,704,908
1877.....	77,796	1,608,182	1905.....	285,529	5,902,402
1878.....	61,688	1,275,204	1906.....	269,886	5,579,039
1879.....	62,407	1,290,058	1907.....	236,216	4,883,020
1880.....	49,044	1,013,827	1908.....	286,858	5,929,880
1881.....	50,636	1,046,737	1909.....	250,320	5,174,679
1882.....	46,154	954,085	1910.....	261,386	5,403,318
1883.....	38,422	794,252	1911.....	238,496	4,930,145
1884.....	35,612	736,165			
1885.....	34,527	713,738		6,542,536	135,246,250

† Calculated from the value : one dollar = 0.048375 ozs.

The placer and hydraulic mining situation shows little change from 1910. There appears to have been a slight decrease, many of the larger companies being still engaged in constructive work. A shortage of water also interfered with the clean up.

Among the camps of the Province producing gold from lode mines Rossland ranks first. The principal companies carrying on active operations during 1911 were as follows:—

The Consolidated Mining and Smelting Company of Canada, Limited, with total shipments of 190,676 tons.

The Le Roi Mining Company, Limited, shipping 6,915 tons in the early part of the year. This Company having gone into voluntary liquidation, sold the Le Roi mine to the Consolidated Mining and Smelting Co. who are now operating it.

The Le Roi No. 2 Mining Company, Limited, shipping 24,800 tons of first class ore and 1,595 tons of concentrates, which were produced from the milling of 18,778 tons of second class ore.

Several of the smaller properties of the camp were actively operated during the year.



The Boundary district comes next in gold production. The output is largely due to the large tonnage of copper ores mined in this district. These ores will average in gold only from 0.04 to 0.05 ounces per ton. Included with this district is the Osoyoos Mining Division, in which is situated the Nickel Plate mine at Hedley, operated by the Hedley Gold Mining Company. In this Company's report for 1911, the following details of interest are given: "Total lineal feet of development in 1911, 1,315; total diamond drilling, 3,160 feet; tons milled, 57,815; assay value, \$10.55 to \$14.36 per ton; receipts, \$679,616.47; expenditures, \$370,814.29; profit, \$300,802.18."

Nelson Mining Division was rather inactive and may be said to have undergone a period of reorganization. The ore is in most cases free-milling, and several of the mines treat the ore in stamp mills producing bullion and concentrates. Others ship direct to the smelter.

There was an increase of production in the Coast district.

### Yukon.

The production of the Yukon in 1911 was \$4,634,574, as compared with \$4,570,362 in 1910, an increase of \$64,212 or 1.4 per cent. In this is included \$54,574 produced by lode mines in the district. The statistics of the production of gold in the Yukon district during the years between 1898 and 1906, as given in Table 11, are based primarily on the receipts of gold at the United States mints and receiving offices and credited to the Canadian Yukon. Although a royalty was exacted on the gold output, it seems certain that particularly during the years of high production, considerable amounts of gold were produced which escaped royalty payment. During the past six years, however, the gold production of the Yukon, as ascertained by the Interior Department, and on which royalty of  $2\frac{1}{2}$  per cent is imposed, has agreed fairly closely with the quantities reported at the United States receiving offices as having been derived from the Canadian Yukon. For the purpose of collecting the royalty, a fixed value of \$15 per ounce is placed upon the crude gold. The actual value of the gold will average somewhat higher than this, however. The average value of the deposits for a number of years as shown by the experience of the United States assay office has been about \$16.50 per ounce. At the Canadian assay office at Vancouver, B.C., there were deposited during the twelve months ending December 31, 1911, 2,073.61 ounces from the Yukon, valued, after all charges had been deducted, at \$34,994.39, showing an average value of about \$16.88 per ounce.

The production of crude placer gold in the Yukon, during the past six years, as ascertained by the Department of the Interior, and upon which a royalty of  $2\frac{1}{2}$  per cent has been collected, is shown in the accompanying table.

### Production of Crude Gold in the Yukon District.

Month.	1906.	1907.	1908.	1909.	1910.	1911.
	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.
January.....	3,732·94	7,308·95	2,464·00	69·50	16·68	.....
February.....	11,693·99	213·00	47·30	115·33	749·28	435·66
March.....	10·30	66·80	16·65	848·39	193·81	13·30
April.....	784·77	202·80	947·00	3·75	0·50	.....
May.....	64,060·66	35,736·62	6,851·96	117·33	43·83	16,719·16
June.....	57,578·27	31,402·14	51,530·90	62,254·92	54,301·17	38,499·39
July.....	49,012·36	26,793·50	35,291·11	52,126·43	37,942·31	42,783·38
August.....	54,947·07	22,392·10	37,930·99	47,440·83	47,673·06	47,677·49
September.....	53,487·08	33,119·51	39,654·27	44,466·20	57,695·65	48,383·63
October.....	51,799·53	35,589·70	37,028·98	26,572·23	51,888·18	58,690·82
November.....	131·81	200·30	1,989·39	4,858·69	21,404·29	11,097·51
December.....	3,352·83	52·80	5,491·76	892·75	3,563·75	13,130·63
	350,391·61	193,078·22	219,244·31	239,766·35	275,472·51	277,430·97

In 1911 the placer production is estimated as \$4,580,000 in gold, representing 221,557 fine ounces of metal, and 50,300 fine ounces of silver, valued at \$26,812, being at the average price of fine silver for the year, making a total valuation of the Yukon placer output of \$4,606,812. In 1910 the placer production was estimated at \$4,550,000, representing 220,106 fine ounces of gold, and 50,000 fine ounces of silver, valued at \$26,743, making a total valuation of \$4,576,743.

Statistics of the annual production of gold in the district since 1885 are shown in Table 11.

GOLD.—TABLE 11.

#### Annual Production in Yukon.

Calendar Year.	Ozs. (fine†).	Value.	Calendar Year.	Ozs. (fine†).	Value.
		\$			\$
1885.....			1899.....	774,000	16,000,000
1886.....	4,387	100,000	1900.....	1,077,553	22,275,000
1887.....	3,386	70,000	1901.....	870,750	18,000,000
1888.....	1,935	40,000	1902.....	701,437	14,500,000
1889.....	8,466	175,000	1903.....	592,594	12,250,000
1890.....	8,466	175,000	1904.....	407,938	10,500,000
1891.....	1,935	40,000	1905.....	381,001	7,876,000
1892.....	4,233	87,500	1906.....	270,900	5,600,000
1893.....	8,514	176,000	1907.....	152,381	3,150,000
1894.....	6,047	125,000	1908.....	174,150	3,600,000
1895.....	12,094	250,000	1909.....	191,565	3,960,000
1896.....	14,513	300,000	1910*.....	221,091	4,570,362
1897.....	120,937	2,500,000	1911*.....	224,197	4,634,574
1898.....	483,750	10,000,000			
				6,818,670	140,954,436

† Calculated from the value: one dollar=0·048375 ozs.

\* Including a small production from lode mines.

Since 1898, a royalty to the extent of \$3,889,907 has been collected on the gold production of this district. The yearly amounts collected, as well as the annual production of gold as ascertained by the Interior Department, are shown

in the accompanying table. The difference between these figures and those shown in Table 11, which are based on the mint receipts of Yukon gold, has already been mentioned and is probably due to two main factors: (1) the fixing of the value of the gold for royalty purposes at \$15 per ounce, a figure from \$1 to \$2 less than the actual value of the gold, and (2) the probability that in the earlier years of royalty collection considerable quantities of gold dust left the camp unrecorded and escaped royalty payment.

### Gold Production in the Yukon, and Royalty Collected.‡

Fiscal Year.	Total gold production.	Total exemption.	Royalty collected on.	Royalty paid.
	\$	\$	\$	\$
1898.....	3,072,773	339,845	2,732,928	273,292
1899.....	7,582,283	1,699,657	5,882,626	588,262
1900.....	9,809,464	2,501,744	7,307,720	730,771
1901.....	9,162,082	1,927,666	7,236,522	592,660
1902.....	9,566,340	1,199,114	8,367,225	331,436
1903.....	12,113,015	.....	12,113,015	302,893
1904.....	10,790,663	.....	10,790,663	272,217
1905.....	8,222,054	.....	8,222,054	206,760
1906.....	6,540,007	.....	6,540,007	163,963
1907 (9 months).....	3,304,791	.....	3,304,791	82,622
1908.....	2,820,162	.....	2,820,162	70,505
1909.....	3,260,282	.....	3,260,282	81,507
1910.....	3,594,251	.....	3,594,251	89,844
1911.....	4,126,728	.....	4,126,728	103,168

‡ From the Report of the Yukon and Mining Lands Branch of the Department of the Interior

## IRON AND STEEL.

### INTRODUCTORY.

There has been a very rapidly growing demand for iron and steel products in Canada during the past few years, accompanied by a corresponding increase in the output of Canadian iron and steel furnaces, although this output probably supplies not more than 30 per cent of the tonnage of iron and steel consumed. The increase in production was continued during 1911, notwithstanding abnormally low prices received for pig iron and steel products. Manufacturers, generally, report a very strong demand, but claim that business has been carried on with a very low margin of profit in order to meet prices quoted on imported products. At the same time extensive preparations are being made to increase the output and supply a larger proportion of the home market.

The total shipments of iron ore in 1911 from mines in Canada were 210,344 tons, whereas blast furnaces consumed 1,695,802 tons, and steel furnaces, 42,892 tons. The shipments from iron ore mines in 1911 were the lowest recorded in twelve years. The production of pig iron was 917,535 short tons, and of steel ingots and castings, 882,396 tons.

The rate of production of iron ore has shown practically no increase during the past twelve years, while the present production of pig iron is nearly ten times that of 1900. About 6 per cent only of the iron ore used in Canadian blast furnaces during 1911 was of domestic origin. Of the coke used, 52 per cent was either imported or made from imported coal, and 22 per cent of the limestone flux used was from sources outside of Canada. In each instance the proportion of imported raw material used is higher than was the case in 1910.

The total production of iron ore in Canada to the end of 1910 has probably not exceeded 5,500,000 tons, while the total consumption of ore in iron and steel blast furnaces since 1886 has been over 13,500,000 tons. During 1911 the tonnage of imported ores used was 1,628,368 tons, which was derived chiefly from Newfoundland and the south shore of Lake Superior.

The assistance granted by the Federal Government to the iron and steel industries in the form of bounties ceased on December 31, 1910, with the exception of the bounty on steel rods, which was continued to June 30, 1911, and the bounty on pig iron and steel made in electric furnaces, which is available until December 31, 1912.

The accompanying table gives a summary of the chief statistics of production of iron ore, pig iron, and steel, while more detailed records will be found in subsequent pages.



## Summary of Iron and Steel Statistics, 1908-1911.

	1908.	1909.	1910.	1911.
	Tons.	Tons.	Tons.	Tons.
Iron ore shipped. ....	238,082	268,043	259,418	210,344
Canadian iron ore charged to blast furnaces...	209,266	257,502	171,191	97,732
Imported iron ore charged to blast furnaces...	1,051,445	1,235,000	1,377,035	1,628,368
Iron ore charged to steel furnaces (a) .....	630,835	757,162	800,797	917,535
Pig iron made. ....	290	5,063	9,763	5,870
Pig iron exported. ....	58,365	148,338	243,859	208,487
Pig iron imported. ....	688,910	900,437	1,034,893	1,120,152
Pig iron consumption (calculated). ....	(a)	(a)	690,912	700,679
Pig iron used in steel furnaces. ....	588,763	754,719	822,284	882,396
Steel ingots and castings made. ....	267,192	377,642	399,762	399,760
Steel rails made. ....	492,076	412,016	491,281	543,933
Canadian coke used in iron blast furnaces. ....	325,670	507,255	476,838	577,388
Imported coke used in iron blast furnaces. ....	1,079,000	565,734	915,425	1,284,401
Iron and steel imported. .... (b)				
Number of completed blast furnaces. .... No.	16	16	17	18
Number of men employed in blast furnaces " ..	1,380	1,486	1,403	1,778
Wages paid in blast furnaces. .... \$	750,224	879,429	1,006,727	1,097,354
Value of pig iron produced. .... \$	8,111,194	9,581,864	11,245,622	12,307,225
Value of iron and steel goods exported. (c) \$	5,907,792	7,172,413	7,895,489	9,907,281
Value of iron and steel goods imported. (d) \$	61,819,698	40,393,431	59,952,197	85,319,541

(a) Not collected.

(b) Figures cover the fiscal year ending March 31 and include all iron and steel goods for which weights are given. For details see Table 20.

(c) Figures cover the calendar year. For details see Table 19.

(d) Figures cover the fiscal year ending March 31. For details see Tables 21 and 22.

## IRON ORE.

The total shipments of iron ore from mines in Canada in 1911 were 210,344 tons, valued at \$522,319 at the shipping point, as compared with 259,418 tons valued at \$574,362 in 1910, and 268,043 tons valued at \$659,316 in 1909. Of the 1911 production, 137,399 tons are classed as hematite and 72,945 tons as magnetite.

Ontario was the largest producer, having nearly 85 per cent of the total production. The principal mines operated during the year were the Moose Mountain at Sellwood, 30 miles north of Sudbury; the Helen, north of Michipicoten, and the Atikokan, 130 miles north of Port Arthur. In addition to these a considerable tonnage of ore was reported as having been raised at the Wilbur mine in Lanark county, but no shipments were made. The total shipments of ore during the year were 175,586 tons, valued at \$446,326, as compared with shipments of 231,445 tons, valued at \$513,722, in 1910. In Nova Scotia, 38,227 tons of ore were mined at the Torbrook mines, Annapolis county, but only 22 tons were shipped; the shipments in 1910 were 18,134 tons. The only mines operated in New Brunswick are those at Austin Brook, near Bathurst, from which 31,120 tons were shipped in 1911, as against 5,336 tons in 1910. The total tonnage mined in 1911 was 96,034. The ore is a magnetite with an intermixture of hematite, and shipments are made from the Company's docks at Newcastle.



In Quebec province, shipments of titaniferous magnetite to the extent of about 3,616 tons were made from the north shore of the St. Lawrence.

The production by provinces during the past three years was as follows:—

IRON.—TABLE 1.

Production of Iron Ore by Provinces, 1909-10-11.

Provinces.	1909.		1910.		1911.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
New Brunswick. . . . .			5,336	11,910	31,120	69,464
Nova Scotia. . . . .			18,134	40,478	22	50
Quebec. . . . .	4,150	5,508	4,503	8,252	3,616	6,479
Ontario. . . . .	263,893	653,808	231,445	513,722	175,586	446,326
	268,043	659,316	259,418	574,362	210,344	522,319

The production during 1910 and 1911 classed as magnetite (including titaniferous iron ores and some ores with an admixture of hematite), hematite (including brown ores), and bog ore, was as follows:—

IRON.—TABLE 2.

Classified Production of Iron Ore, 1910-11.

Character of ore.	1910.			1911.		
	Short ton.	Value.	Per ton.	Short ton.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
Magnetite. . . . .	127,768	289,870	2 27	72,945	154,295	2 12
Hematite. . . . .	130,380	281,090	2 16	137,399	368,024	2 68
Bog. . . . .	1,270	3,402	2 68	Nil		
	259,418	574,362	2 21	210,344	522,319	2 48

A record of the production by provinces in past years is shown in Tables 3 and 4. There was a considerable production in Ontario previous to 1886 which is not recorded.

## IRON.—TABLE 3.

## Production of Iron Ore by Provinces, 1886-1911.

Calendar Year.	New Brunswick.	Nova Scotia.	Quebec.	Ontario.	British Columbia.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1886.....		44,388		16,032	3,941	64,361
1887.....		43,532	13,404	16,598	2,796	76,330
1888.....		42,611	10,710	16,894	8,372	78,587
1889.....		54,161	14,533		15,487	84,181
1890.....		49,206	22,305			76,511
1891.....		53,649	14,380		950	68,979
1892.....		78,258	22,690		2,300	103,248
1893.....		102,201	22,076		1,325	125,602
1894.....		89,379	19,492		1,120	109,991
1895.....		83,792	17,783		1,222	102,797
1896.....		58,810	17,630	15,270	196	91,906
1897.....		23,400	22,436	2,770	2,099	50,705
1898.....		19,079	17,873	21,111	280	58,343
1899.....		28,000	19,420	25,126	2,071	74,617
1900.....		18,940	19,000	82,950	1,110	122,000
1901.....		18,619	15,489	272,538	7,000	313,646
1902.....		16,172	18,524	359,288	10,019	404,003
1903.....		40,335	12,035	209,634	2,290	264,294
1904.....		61,293	16,152	141,601		219,046
1905.....		84,952	12,681	193,464		291,097
1906.....		97,520	9,933	141,078		248,831
1907.....		89,839	12,748	207,769	2,500	312,856
1908.....		11,802	10,103	216,177		238,082
1909.....			4,150	263,893		268,043
1910.....	5,336	18,134	4,503	231,445		259,418
1911.....	31,120	22	3,616	175,586		210,344

## IRON.—TABLE 4.

## Production of Iron Ore in Nova Scotia, 1876-1885.

Calendar Year.	Tons.	Calendar Year.	Tons.
1876.....	15,274	1881.....	39,843
1877.....	16,879	1882.....	42,135
1878.....	36,600	1883.....	52,410
1879.....	29,889	1884.....	54,885
1880.....	51,193	1885.....	48,129

Following is a list of the principal producers of iron ore in Canada:—

Canada Iron Corporation, Limited, Mark Fisher Bldg., Montreal, Que.

E. H. Duval, Lévis, Que. (Guay P.O.).

H. C. Bosse, 92 St. Peter St., Quebec, Que.

Joseph Bouchard, Baie St. Paul, Que.

Loughborough Mining Co., Schenectady, N.Y.

The Canadian Iron Ore Co., 1231 St. Valier St., Quebec, Que.

Exploration Syndicate of Ontario, Limited, Wilbur, Ont.

The Lake Superior Power Company, Sault Ste. Marie, Ont.

Atikokan Iron Company, Port Arthur, Ont.

Moose Mountain, Limited, Sellwood, Ont.

Dominion Bessemer Ore Company, Limited, 472 Bullitt Bldg., Philadelphia, Pa.

#### EXPORTS AND IMPORTS.

The Customs Department does not keep a separate record of the imports of iron ore into Canada, but as the imports are practically all used in blast furnaces the statistics of consumption of imported ores in these furnaces will serve the same purpose.

There were used in Canadian iron furnaces during 1911, 1,628,368 tons of imported iron ores, as compared with 1,377,035 tons in 1910. Increasing amounts of iron ores have been imported since 1896, the total quantity imported during the sixteen years being 10,526,489 tons.

According to United States reports of Commerce and Navigation there were exported to Canada during the twelve months ending June 30, 1911, 826,071 tons (2,000 pounds) of iron ore, valued at \$2,496,246, and during the previous year 609,617 tons (2,000 pounds), valued at \$1,636,917.

The shipments from Newfoundland to Canada during the calendar year 1911 were 737,261 tons, as compared with 808,762 tons during the year 1910.

There were exported during 1911 about 37,686 tons of iron ore, valued at \$133,411, as compared with exports of 114,499 tons, valued at \$324,186, in 1910.

The ores exported in 1911 were chiefly those from Bathurst, N.B., Moose Mountain, Ont., and titaniferous iron ores from Quebec.

Annual statistics of exports are shown in the following tables:—

IRON.—TABLE 5.

#### Exports of Iron Ore, Calendar Years 1893-1911.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1893.....	2,419	7,590	1903*.....	368,233	922,571
1894.....		21,294	1904*.....	168,828	401,738
1895.....	1,571	3,909	1905*.....	168,289	407,881
1896.....	1,033	1,911	1906.....	74,778	149,177
1897.....	403	811	1907.....	25,901	45,907
1898.....	182	278	1908.....	(a)	
1899.....	4,145	9,538	1909.....	21,956	61,954
1900.....	5,527	13,511	1910.....	114,499	324,186
1901*.....	306,199	762,283	1911.....	37,686	133,411
1902*.....	428,901	1,065,019			

\* The export figures for the five years indicated are incorrect owing to a duplication of entries.  
(a) The figures of the Trade Report for this year include ferro-products, and are, therefore, omitted.

IRON.—TABLE 6.

## Exports of Iron Ore, Fiscal Years, 1879-1911.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		\$			\$
1879.....	3,562	7,530	1896.....	14	35
1880.....	30,524	76,474	1897.....	1,320	2,492
1881.....	44,677	114,850	1898.....	360	402
1882.....	43,835	135,463	1899.....	1,849	4,968
1883.....	44,914	138,775	1900.....	4,327	7,689
1884.....	25,308	66,549	1901*.....	58,401	150,657
1885.....	54,367	132,074	1902*.....	525,983	1,303,901
1886.....	7,542	23,039	1903*.....	293,510	733,230
1887.....	23,345	71,934	1904*.....	233,850	579,883
1888.....	13,544	39,945	1905*.....	224,908	540,909
1889.....	24,752	60,289	1906*.....	148,040	345,540
1890.....	13,811	31,376	1907†.....	34,191	65,367
1891.....	14,648	32,582	1908.....	26,310	46,686
1892.....	7,707	36,935	1909.....	3,933	71,663
1893.....	7,811	26,114	1910.....	31,535	80,540
1894.....	1,559	9,026	1911.....	104,807	304,718
1895.....	2,315	5,743			

\* See foot-note to Table 5. † Nine months ending March 31, 1907.

IRON.—TABLE 7.

## Imports of Iron Ore into the United States from Canada, 1893-1911.\*

Year ending June 30.	Short tons.	Value.	Year ending June 30.	Short tons.	Value.
		\$			\$
1893.....	7,706	17,186	1903.....	144,725	320,263
1894.....	301	756	1904.....	126,995	283,765
1895.....	2,681	10,114	1905.....	120,241	245,623
1896.....	39	142	1906.....	113,809	220,112
1897.....	2,535	5,243	1907.....	34,731	52,765
1898.....	1,313	2,904	1908.....	32,124	55,617
1899.....	2,585	5,120	1909.....	3,490	12,660
1900.....	4,477	5,550	1910.....	36,070	97,984
1901.....	34,453	76,159	1911.....	117,393	264,452
1902.....	309,527	685,540			

\* Compiled from the 'Foreign Commerce and Navigation of the United States.'

## PIG IRON AND STEEL.

An increase of 14.6 per cent is shown in the production of pig iron in Canada in 1911 over the production of 1910, as compared with an increase of 5.5 per cent in 1910 over that of 1909.

At the close of the year Canada had eighteen completed furnaces and two under construction, grouped in ten separate plants and operated by eight separate companies or corporations.



The total production in 1911 was 917,535 short tons (819,228 long tons), valued at approximately \$12,307,125, as compared with 800,797 short tons (714,998 long tons), valued at \$11,245,622, in 1910, and 757,162 short tons (676,038 long tons), valued at \$9,581,864, in 1909. The Londonderry furnace was not in operation during the past three years. These figures do not include the output from electric furnaces making ferro-products, which are situated at Welland and Sault Ste. Marie, Ont., and Buckingham, Que. Ferro-silicon, ferro-titanium, and electric pig were made at Welland, and ferro-phosphorus at Buckingham during 1911, but the Sault Ste. Marie plant was not in operation during the year.

Of the total output of pig iron in 1911, 20,759 tons, valued at \$365,832, or \$17.62 per short ton, were made with charcoal as fuel, and 896,776 tons, valued at \$12,041,393, or \$13.43 per ton, with coke. The amount of charcoal iron made in 1910 was 17,164 tons, and in 1909, 17,003 tons; while the quantity made with coke in 1910 was 783,633 tons, and in 1909, 740,159 tons.

The classification of the coke iron production in 1911, according to the purpose for which it was intended, was as follows:—

Bessemer, 208,626 tons; basic, 464,221 tons; foundry (including miscellaneous), 223,929 tons.

The classification of the production in 1910 was:—

Bessemer, 219,491 tons; basic, 425,400 tons; foundry, 138,742 tons.

The total production of pig iron in 1911 and 1910 is shown by provinces in the following table, the average value per ton being also indicated. In the case of Nova Scotia, a large proportion of the pig iron is directly converted to steel, and as a very small portion of the metal is sold as pig iron it is somewhat difficult to place a satisfactory valuation upon the output. For statistical purposes a value of \$12 per short ton has been placed upon this production. The Quebec production is entirely charcoal iron, which has for many years commanded a high price.

IRON.—TABLE 8.

Production of Pig Iron by Provinces, 1910-11.

Provinces.	1910.			1911.			Percentage increase or decrease in quantity.
	Tons.	Value.	Value per ton.	Tons.	Value.	Value per ton.	
		\$	\$ cts.		\$	\$ cts.	%
Nova Scotia ..	350,287	4,203,444	12 00	390,242	4,682,904	12 00	+ 11.4
Quebec.....	3,237	85,255	26 34	658	17,282	26 24	— 79.7
Ontario .....	447,273	6,956,923	15 55	526,635	7,606,939	14 44	+ 17.7
Total....	800,797	11,245,622	14 04	917,535	12,307,125	13 41	+ 14.6



A record of the production by provinces since 1887 is shown in Table 9. It will be observed that while the production in Nova Scotia has remained fairly constant during the past five years, the Ontario production has increased from 275,558 tons in 1906 to 526,635 tons in 1911. The proportions of the whole contributed by the several provinces were, in 1911: Nova Scotia, 42.5 per cent; Ontario, 57.4 per cent, and Quebec less than one-tenth of one per cent.

IRON.—TABLE 9.

## Annual Production of Pig Iron by Provinces, 1887-1911.

Year.	NOVA SCOTIA.		ONTARIO.		QUEBEC.		TOTAL.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$		\$
1887....	19,320	250,000	.....	.....	5,507	116,192	24,927	366,192
1888....	17,556	211,403	.....	.....	4,242	101,832	21,799	313,235
1889....	21,289	383,202	.....	.....	4,632	116,670	25,921	499,872
1890....	18,382	262,608	.....	.....	3,390	69,080	21,772	331,688
1891....	21,353	309,527	.....	.....	2,533	59,374	23,891	337,901
1892....	40,049	583,556	.....	.....	2,394	53,865	42,443	673,421
1893....	46,472	553,408	.....	.....	9,475	236,875	55,947	790,283
1894....	41,344	449,533	.....	.....	8,623	196,914	49,967	646,447
1895....	35,192	417,083	.....	.....	7,262	169,653	42,454	586,736
1896....	32,351	400,829	28,302	368,942	6,615	154,358	67,268	924,129
1897....	22,500	230,000	26,115	291,466	9,392	217,235	58,007	738,701
1898....	21,627	221,677	48,253	530,789	7,135	159,929	77,015	912,395
1899....	31,100	404,300	64,749	808,157	7,094	164,849	102,943	1,377,306
1900....	28,133	421,995	62,387	938,725	6,055	140,978	96,575	1,501,698
1901....	151,130	1,764,017	116,371	1,599,413	6,875	149,493	274,376	3,512,923
1902....	237,244	2,477,767	112,688	1,584,273	7,970	181,501	357,902	4,243,541
1903....	201,246	2,186,273	87,004	1,345,464	9,635	210,973	297,885	3,742,710
1904....	164,488	1,700,130	127,845	1,746,126	11,121	241,729	303,454	3,687,985
1905....	261,014	2,440,722	256,704	3,868,197	7,588	166,267	525,306	6,475,186
1906....	315,008	3,439,217	275,558	4,338,275	7,845	177,644	598,411	7,955,136
1907....	366,456	4,211,913	275,459	4,581,309	10,047	232,004	651,962	9,125,226
1908....	352,642	3,554,540	271,484	4,385,271	6,709	171,383	630,835	8,111,194
1909....	345,380	3,453,800	407,012	6,002,441	4,770	125,623	757,162	9,581,864
1910....	350,287	4,203,444	447,273	6,956,923	3,237	85,255	800,797	11,245,622
1911....	390,242	4,682,904	526,635	7,606,939	658	17,282	917,535	12,307,125

*Prices.*—The average price of domestic pig iron at Toronto ranged during the first five months of 1911 from \$19 to \$20 per gross ton, and during the balance of the year from \$19 to \$19.50.

A record of the average monthly prices per gross ton of Bessemer pig iron and of grey forge pig iron at Pittsburgh is shown in the accompanying tables:—

### Bessemer Pig Iron at Pittsburgh, per Gross Ton (2,240 pounds).

	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
January.....	16 70	22 15	13 91	16 85	18 35	23 15	19 00	17 34	19 90	15 90
February.....	16 93	21 45	13 66	16 41	18 35	22 85	17 90	16 78	19 34	15 90
March.....	17 37	21 85	14 25	16 35	18 28	22 85	17 86	16 25	18 60	15 90
April.....	18 75	21 28	14 18	16 35	18 19	23 35	17 49	15 78	18 27	15 90
May.....	20 75	20 01	13 60	16 16	18 10	24 01	16 93	15 84	17 52	15 90
June.....	21 56	19 72	12 81	16 65	18 23	24 27	16 90	16 05	16 60	15 90
July.....	21 60	18 89	12 40	14 85	18 41	23 55	16 83	16 46	16 40	15 90
August.....	21 62	18 35	12 81	15 20	19 00	22 90	16 23	17 03	16 09	15 90
September.....	21 75	17 22	12 63	15 91	19 54	22 90	15 90	18 05	15 90	15 90
October.....	21 75	16 05	13 10	16 54	20 35	22 00	15 71	19 53	15 90	15 44
November.....	21 68	15 18	14 85	17 85	22 85	20 65	16 59	19 90	15 82	15 00
December.....	21 75	14 40	16 65	18 35	23 75	19 34	17 40	19 90	15 90	15 03

### Grey Forge Pig Iron at Pittsburgh, per Gross Ton (2,240 pounds).

	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
January.....	16 00	20 50	12 81	16 11	17 30	22 58	17 00	15 40	17 40	14 09
February.....	16 37	20 50	12 75	15 99	17 29	22 20	15 99	15 09	17 02	14 27
March.....	17 44	20 87	13 17	16 00	16 91	21 76	15 90	14 65	16 15	14 40
April.....	18 56	20 45	13 09	15 77	16 66	21 72	15 45	14 40	16 09	14 40
May.....	19 75	19 87	12 62	15 57	16 49	22 88	14 90	14 40	15 90	14 27
June.....	20 06	18 87	12 27	15 18	16 35	23 15	14 90	14 77	15 20	14 00
July.....	21 00	17 90	11 92	14 55	16 41	22 96	14 90	14 85	14 52	13 90
August.....	20 69	16 04	11 89	14 36	17 75	21 90	14 71	15 21	14 30	13 90
September.....	20 81	15 25	11 75	14 72	18 35	21 15	14 46	16 15	14 15	13 84
October.....	21 60	14 20	12 30	15 66	19 47	20 40	14 40	17 02	14 15	13 65
November.....	21 06	13 00	14 25	16 58	22 45	19 17	14 90	17 27	14 09	13 47
December.....	20 55	12 80	15 85	16 97	22 85	18 40	15 25	17 40	13 90	13 40

The quantities of iron ore, coke, charcoal, limestone, etc., consumed in blast furnaces in 1910 and 1911 are shown as follows:—

IRON.—TABLE 10.

### Ore, Fuel, and Flux Charged to Blast Furnaces, in Years 1910-11.

	1910.			1911.		
	Quantity.	Value.	Canadian and imported.	Quantity.	Value.	Canadian and imported.
		\$	%		\$	%
Canadian iron ore and mill cinder..... Tons.	171,191	564,838	11 }	97,732	583,105	6 }
Imported iron ore..... "	1,377,035	3,668,409	89 }	1,628,368	3,358,413	94 }
Canadian coke..... "	491,281	1,596,664	51 }	543,933	1,767,782	48 }
*Imported coke..... "	476,838	2,263,917	49 }	577,388	2,393,820	52 }
Charcoal..... Bus.	1,615,919	159,662	.....	1,960,459	178,274	.....
Canadian limestone..... Tons.	464,584	360,756	82 }	492,737	303,301	78 }
Imported limestone..... "	104,771	85,636	18 }	132,479	130,221	22 }

\*Including coke made from imported coal.

Previous to 1896 pig iron was made entirely from Canadian ores. Since that date, however, increasing quantities of imported ore have been used as well as imported fuels and fluxes, and in 1911 about 94 per cent of the ore charged, 52 per cent of the coke, and 22 per cent of the limestone were imported. This condition is due largely to questions of cost and transportation affecting each furnace. The Newfoundland iron ores can be cheaply and conveniently laid down in Sydney, N.S.; in fact the iron industry here has been built up on the basis of these ores and of the local coal supplies. In Ontario, also, large quantities of imported ores are used. In 1911 the imported ores used in Ontario amounted to 849,086 tons, and the Canadian ores, 85,678 tons, the imported ores being derived from Michigan and Minnesota deposits: thus during 1911 about 91 per cent of the ore used in this Province was imported, as compared with 83 per cent in 1910, and about 71 per cent in 1909. The fuel used in Ontario was also almost altogether imported, as well as a portion of the limestone flux.

IRON.—TABLE 11.

## Iron Ore, Fuel, and Flux Charged to Furnaces since 1887.

Calendar Year.	IRON ORE CHARGED.		FUEL CHARGED.			Limestone.
	Canadian.	Imported.	Charcoal.	*Coke from Canadian coal.	Imported coke.	
	Tons.	Tons.	Bushels.	Tons.	Tons.	Tons.
1887.....	60,434	.....	940,400	33,581	.....	17,171
1888.....	54,956	.....	804,286	30,228	.....	16,857
1889.....	65,670	.....	755,800	36,333	.....	22,122
1890.....	57,304	.....	589,860	34,073	.....	18,478
1891.....	60,933	.....	441,812	32,796	.....	11,377
1892.....	96,948	.....	1,121,365	52,622	.....	22,967
1893.....	124,053	.....	1,302,720	65,332	.....	27,797
1894.....	108,871	.....	1,173,970	60,026	.....	35,101
1895.....	93,208	.....	789,561	51,629	.....	31,585
1896.....	96,560	46,300	756,600	50,067	33,990	37,462
1897.....	53,658	55,722	1,031,800	35,800	27,810	31,273
1898.....	57,881	77,107	836,400	31,952	50,407	33,913
1899.....	66,384	120,650	1,928,025	44,844	64,648	51,826
1900.....	71,341	112,042	1,799,737	45,021	59,345	52,966
1901.....	156,613	361,010	1,835,736	207,835	115,367	169,399
1902.....	125,664	559,381	2,146,623	362,208	112,314	293,594
1903.....	82,035	485,911	2,322,030	350,190	96,540	277,452
1904.....	180,932	454,671	3,477,470	257,182	130,210	211,278
1905.....	116,974	861,847	4,404,394	365,897	243,882	369,715
1906.....	221,733	982,740	2,168,476	462,672	304,676	456,036
1907.....	244,104	1,117,260	1,682,085	521,068	327,082	488,462
1908.....	209,266	1,051,445	1,121,990	492,076	325,670	483,065
1909.....	257,502	1,235,000	1,779,258	412,016	507,255	526,076
1910.....	171,191	1,377,035	1,615,919	491,281	476,838	569,355
1911.....	97,732	1,628,368	1,960,459	543,933	577,888	625,216

\* Includes for the first ten years small quantity of coal.

Of eighteen completed furnaces fifteen were in blast in 1911 for varying periods of time. The operating companies, with numbers and capacities of furnaces, were as follows:—

Dominion Iron and Steel Company, Sydney, C.B.: four completed furnaces of 280 tons capacity each per day; one operated throughout 1911, one for 305 days, one for 272 days, and the fourth for 244 days.

Nova Scotia Steel and Coal Company, Limited, New Glasgow, N.S.: one furnace at Sydney Mines, C.B., of 200 tons capacity; operated 360 days.

Londonderry Iron and Mining Company, Limited, Londonderry, N.S.: one furnace of 100 tons capacity; idle throughout the year.

Canada Iron Corporation, Limited, Montreal, Que.: two small furnaces of seven and eight tons capacity, at Drummondville, Que., one being operated 106 days; one furnace of 25 tons daily capacity, at Radnor Forges, Que., idle throughout the year; two furnaces of 125 tons and 250 tons, at Midland, Ont., operated for 365 days.

Standard Chemical Iron and Lumber Company of Canada, Limited, Deseronto, Ont.: one furnace with a daily capacity of 65 tons; operated for 11 months during 1911.

The Steel Company of Canada, Limited, Hamilton, Ont.: two furnaces, one of 200 tons capacity operated for 308 days in 1911, a second furnace of 300 tons capacity operated 327 days in 1911.

Algoma Steel Company, Limited, Sault Ste. Marie, Ont.: three furnaces at Steelton, near Sault Ste. Marie, two of 250 tons capacity each, operated for 310 and 357 days, respectively; and one of 450 tons capacity, operated for 261 days.

The Atikokan Iron Company, Limited, Port Arthur, Ont.: one furnace of 100 tons capacity; operated for 228 days during 1911.

The total daily capacity of the eighteen furnaces is about 3,580 tons.

The average number of men employed in blast furnace operations in 1911 is reported as 1778, and the total wages paid, \$1,097,354. Of the eighteen completed furnaces, twelve were in blast and six idle on December 31, 1911.

With respect to new furnaces under way or contemplated, the Dominion Iron and Steel Company have met with considerable delay in the completion of their fifth furnace, which has now been under construction for some time. It is expected, however, that this furnace will shortly be completed. A beginning has also been made on the erection of a sixth furnace. This Company has also erected wire mills and has commenced the manufacture of nails.

The Steel Company of Canada, Limited, has undertaken the erection at Hamilton of a blooming mill, billet mill, rod and bar mill, together with two more 50 ton open-hearth furnaces.

The Lake Superior Corporation completed their new No. 3 blast furnace during the year. Their new coke ovens and merchant mills were also placed in full operation. A sixth open-hearth furnace is in progress and mixers are being installed.

## EXPORTS AND IMPORTS OF PIG IRON.

There has been comparatively little pig iron exported from Canada. During 1911 the exports were 5,870 tons, valued at \$271,968, or an average value per



ton of \$40.33; as compared with exports of 9,763 tons, valued at \$296,310, or an average of \$30.35 per ton, in 1910. The exports during 1909 were 5,063 tons, valued at \$186,778, or an average of \$36.89; and during 1908, 290 tons, valued at \$10,614, or an average of \$42.45 per ton. These exports probably consist chiefly of ferro-silicon and high grade charcoal pig iron.

Considerable quantities of pig iron are annually imported into Canada. During the calendar year 1911 the imports were 208,487 tons, valued at \$2,610,989, or an average of \$12.52 per ton; as against 243,859 tons, valued at \$3,364,847, imported in 1910. No charcoal pig iron was imported in 1911. The 1910 imports included 227,753 tons of pig iron, valued at \$3,122,695, or an average of \$13.71 per ton, and 16,106 tons of charcoal pig iron, valued at \$242,152, or an average of \$15.03 per ton.

The annual imports of these two classes of pig iron since 1880 are shown in the accompanying table, No. 12, the statistics being given therein for the fiscal year.

IRON.—TABLE 12.

## Annual Imports of Pig Iron Since 1880.

Fiscal Year.	PIG IRON.		CHARCOAL PIG IRON.		TOTAL.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
1880, year ending June 30.....	(a) 23,159	371,956	.....	.....	23,159	371,956
1881 " " .....	(a) 43,630	715,997	.....	.....	43,630	715,997
1882 " " .....	56,594	811,221	6,837	211,791	63,431	1,023,012
1883 " " .....	75,295	1,085,755	2,198	58,994	77,493	1,144,749
1884 " " .....	49,291	653,708	2,893	66,602	52,184	723,010
1885 " " .....	42,279	545,426	1,119	27,333	43,398	572,759
1886 " " .....	42,463	528,483	3,185	60,086	45,648	588,569
1887 " " .....	46,295	554,388	3,919	77,420	50,214	631,808
1888 " " .....	(b) 48,973	648,012	.....	.....	48,973	648,012
1889 " " .....	(b) 72,115	864,752	.....	.....	72,115	864,752
1890 " " .....	(b) 87,613	1,148,078	.....	.....	87,613	1,148,078
1891 " " .....	(b) 81,317	1,085,929	.....	.....	81,317	1,085,929
1892 " " .....	(b) 68,918	886,485	.....	.....	68,918	886,485
1893 " " .....	56,849	682,209	5,544	84,358	62,793	766,567
1894 " " .....	42,376	483,787	2,906	34,968	45,282	518,755
1895 " " .....	31,637	341,259	2,780	31,171	34,417	372,430
1896 " " .....	36,131	394,591	917	11,726	37,048	406,317
1897 " " .....	25,766	291,788	2,936	35,373	28,702	327,161
1898 " " .....	37,186	382,103	2,250	23,533	39,436	405,636
1899 " " .....	44,261	452,911	1,955	19,123	46,216	472,034
1900 " " .....	49,767	811,490	1,816	38,736	51,583	850,226
1901 " " .....	35,293	548,033	490	7,121	35,783	555,154
1902 " " .....	39,978	585,077	38	726	40,016	585,803
1903 " " .....	91,730	1,338,574	882	16,352	92,612	1,354,926
1904 " " .....	62,515	894,728	.....	.....	62,515	894,728
1905 " " .....	71,005	857,879	.....	.....	71,005	857,879
1906 " " .....	96,797	1,401,047	.....	.....	96,797	1,401,047
1907, nine months ending March 31.....	150,127	2,280,860	30	675	150,157	2,281,535
1908, year ending March 31.....	210,053	3,448,125	2,237	45,475	212,290	3,493,600
1909 " " .....	57,669	857,357	922	16,575	58,591	873,932
1910 " " .....	158,910	2,118,445	596	8,690	159,506	2,127,135
1911 " " .....	254,284	3,376,843	15,818	237,088	270,102	3,613,931

(a) Comprises pig iron of all kinds.

(b) These figures appear in Custom reports under heading "iron in pigs, iron kentledge, and cast iron."



IRON.—TABLE 13.  
Annual Exports of Pig Iron, 1896-1911.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1896.....	2,187	55,448	1904.....	21,016	200,363
1897.....	3,099	81,381	1905.....	866	22,284
1898.....	1,278	32,645	1906.....	305	7,429
1899.....	6,981	149,190	1907.....	439	13,504
1900.....	3,513	88,052	1908.....	290	10,614
1901.....	57,650	593,739	1909.....	5,063	186,778
1902.....	75,195	778,619	1910.....	9,763	296,310
1903.....	4,400	78,382	1911.....	5,870	271,968

*World's Production.*—The production of pig iron in other countries is given hereunder for the past six years, in order to show the relative position occupied by Canada in the production of this metal.

IRON.—TABLE 14.  
Production of Pig Iron in Principal Countries of the World, from 1906 to 1911: metric tons.

—	1906.	1907.	1908.	1909.	1910.	1911.
United States ....	25,713,556	26,195,340	16,191,907	26,209,677	27,741,990	24,029,296
Germany.....	12,292,819	12,375,159	11,805,321	12,644,946	14,227,455	15,280,527
United Kingdom..	10,347,385	10,276,689	9,202,280	9,685,045	10,380,799	9,874,693
France.....	3,314,162	3,590,235	3,400,771	3,573,848	4,032,459	4,410,866
Russia.....	2,691,606	2,823,309	2,805,384	2,874,822	3,042,302	3,588,449
Austria-Hungary..	1,687,581	1,872,684	2,041,523	2,044,573	2,006,842 (a)	2,089,867
Belgium.....	1,375,775	1,406,980	1,270,050	1,616,370	1,803,500 (a)	2,072,843
Canada.....	542,875	591,456	572,290	686,893	726,478	832,382
Sweden.....	604,789	615,778	567,821	444,764	604,300	633,800
Spain.....	379,241	355,240	403,554	389,000 (a)	425,000 (a)	435,000
Italy.....	135,296	112,232	112,924	207,800 (a)	343,600 (a)	253,322
China.....	*34,365	*36,306	66,409	74,000 (a)	120,000 (a)	94,826
Japan.....	42,679	51,943	45,396 (a)	161,020	187,793 (a)	162,000
Australasia.....		29,902	30,393	29,762	42,268 (a)	36,354

\* Exports. † Not available. (a) From statistics by James Watson & Co., Glasgow, Scotland.

### FERRO-PRODUCTS.

Ferro-silicon, ferro-phosphorus, and ferro-titanium were produced in Canada in electric smelting plants during 1911. The ferro-titanium was produced in an experimental way only. Ferro-phosphorus was made by the Electric Reduction Company at Buckingham, Que. In former years this Company has also manufactured other ferro-products, including ferro-silicon and ferro-chrome.

The Electric Metals, Limited, at Welland, Ont., engaged chiefly in the production of ferro-silicon. There was also, however, considerable experimental work done in the production of pig iron in electric furnaces and in the production of ferro-titanium.

The electric furnace plant of the Lake Superior Corporation at Sault Ste. Marie was not operated during the year.

The total production of electric furnace plants in 1911 was 7,507 short tons, valued at \$376,404.

The imports of ferro-silicon, manganese, etc., during the calendar year 1911, were 17,226 tons, valued at \$429,465, or an average of \$24.93 per ton. The imports during the calendar year 1910 were 18,900 tons, valued at \$464,741, or an average of \$24.59 per ton. The imports since 1887 are shown in Table 15, the figures of the table being for the fiscal year.

IRON.—TABLE 15.

## Imports of Ferro-Manganese, Etc., 1887-1911.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		\$			\$
*1887.....	123	1,435	+1900.....	1,149	39,064
*1888.....	1,883	29,812	+1901.....	1,512	38,954
*1889.....	5,868	72,108	+1902.....	6,513	150,977
*1890.....	696	18,895	+1903.....	6,350	162,710
*1891.....	2,707	40,711	+1904.....	2,975	75,554
*1892.....	1,311	23,930	+1905.....	12,935	246,815
*1893.....	529	15,858	+1906.....	15,023	462,739
*1894.....	284	9,885	+1907 (9 months).....	16,414	610,875
+1895.....	164	5,408	+1908.....	17,417	612,062
+1896.....	652	12,811	+1909.....	13,053	388,024
+1897.....	426	9,233	+1910.....	14,952	332,486
+1898.....	1,418	22,516	+1911.....	18,796	461,331
+1899.....	1,160	22,539			

\* These amounts include: ferro-manganese, ferro-silicon, spiegel, steel bloom ends and crop ends of steel rails, for the manufacture of iron or steel.

† Ferro-silicon, spiegeleisen, and ferro-manganese.

## STEEL.

The production of steel ingots and castings in 1911 was 882,396 tons, as compared with 822,284 tons in 1910 and 754,719 tons in 1909. In 1911 the production of open-hearth ingots was reported as 651,676 tons; Bessemer ingots, 209,817 tons; direct open-hearth castings, 20,163 tons, and other steels, 740 tons. The total increase in production over 1910 was 60,112, or a little over 7 per cent.

The production during the past five years is shown in Table 16 following:—

IRON.—TABLE 16.

## Production of Steel, 1907-1911.

	1907.	1908.	1909.	1910.	1911.
	Tons.	Tons.	Tons.	Tons.	Tons.
<i>Ingots</i> — Open-hearth (basic).....	459,240	443,442	535,988	580,932	651,676
Bessemer (acid) .....	225,989	135,557	203,715	222,668	209,817
<i>Castings</i> — Open-hearth.....	20,602	9,051	14,013	18,085	20,163
Other steels.....	1,151	713	1,003	599	740
Total.....	706,982	588,763	754,719	822,284	882,396

Statistics showing the quantities of the principal materials used in steel furnaces were obtained for the first time for the year 1910, and it may be of interest to refer to these here. The total quantity of pig iron used in steel furnaces during 1911 was 700,679 tons, of which 640,636 tons were produced by firms reporting, and 60,043 tons purchased. The quantity of ferro-alloys used was 21,359 tons purchased. Scrap, etc., was used to the extent of 278,797 tons, being 198,482 tons produced by the firms reporting, and 80,315 tons purchased. Ores used included 829 tons of manganese ore and 42,892 tons of iron ore, while 130,270 tons of limestone or dolomite flux were used and 8,067 tons of fluorspar. In Ontario a little over 662 million cubic feet of natural gas were used, while in Nova Scotia coke oven gas was used at Sydney, of which a record of quantity is not obtained.

In 1910 the total quantity of pig iron used in steel furnaces was 690,913 tons, of which 601,219 tons were produced by firms reporting, and 89,694 tons purchased. The quantity of ferro-alloys used was 8,143 tons purchased. Scrap, etc., was used to the extent of 211,453 tons, being 140,913 tons produced by the firms reporting and 70,540 tons purchased. Ores used included 1,317 tons of manganese ore and 39,332 tons of iron ore, while 144,110 tons of limestone or dolomite flux were used and 7,461 tons of fluorspar. In Ontario a little over 600 million cubic feet of natural gas were used.

Statistics of the production of steel ingots and castings since 1894 are given in the following table, the figures for 1894 to 1906, inclusive, having been collected and published by the American Iron and Steel Association; those for the years 1907 to 1911 have been collected by this Department and are as shown in detail in Table 16.

IRON.—TABLE 17.

**Annual Production of Steel Ingots and Castings, 1894-1911.**

Calendar Year.	Short tons.	Calendar Year.	Short tons.	Calendar Year.	Short tons.
1894.....	28,767	1900.....	26,406	1906.....	639,396
1895.....	19,040	1901.....	29,214	1907.....	706,982
1896.....	17,920	1902.....	203,881	1908.....	588,763
1897.....	20,608	1903.....	203,296	1909.....	754,719
1898.....	24,125	1904.....	166,381	1910.....	822,284
1899.....	24,640	1905.....	451,863	1911.....	882,396

Following is a list of firms making steel in Canada:—

- Dominion Iron and Steel Company, Sydney, N.S.
- Nova Scotia Steel and Coal Company, New Glasgow, N.S.
- Canadian Steel Foundries, Limited, Montreal, Que.
- The Algoma Steel Company, Sault Ste. Marie, Ont.
- The Steel Company of Canada, Limited, Hamilton, Ont.
- The Wm. Kennedy Sons, Limited, Owen Sound, Ont.

*Rolled Products, etc.*—Complete statistics of the production of rolled products and of manufactured steel have not been received; returns from seven of the largest producers, however, show a production of blooms, billets, slabs, etc., of 737,261 tons, of which 719,514 tons were used by the producer for further manufacture, and 17,747 tons sold to other rolling mills.

The production of rails was 399,760 tons; of rods, 85,811 tons; of bars, 199,623 tons, and of other rolled products, 65,076 tons. The production of steel rails in 1910 was returned as 399,762 tons, and in 1909, 377,642 tons.

The production of finished rolled iron and steel in Canada from 1906 to 1911, as ascertained and published by the American Iron and Steel Association, was as follows, in long tons:—

IRON.—TABLE 18.

**Annual Production of Rolled Iron and Steel, 1907-11.**

Products — Gross tons.	1907.	1908.	1909.	1910.	1911.
Rails.....	311,461	268,692	344,830	366,465	360,547
Structural shapes and wire rods.....	65,541	41,520	74,136	80,993	76,617
Plates and sheets. ....	18,493	11,656	36,241	26,642	14,833
Nail plate, merchant bars, and all other finished rolled forms.....	204,684	174,649	207,534	265,711	323,427
Total .....	600,179	496,517	662,741	739,811	775,424

**BOUNTIES.**

Bounties on iron and steel made in Canada were provided for by the Dominion Government in 1897 (Chapter 6, Statutes of Canada, 1897). This Act was amended in 1899 (Chapter 8, Statutes of Canada, 1899), and again in 1903 (Chapter 68, Statutes of Canada, 1903). The latter Act provided for the payment of bounty until June 30, 1907. On April 27, 1907, a new Act was passed (Chapter 24, Statutes of Canada, 1907), providing for the further payment of bounties from January 1, 1907, to December 31, 1910, and in the case of pig iron made by electric smelting, until December 31, 1912. An Act assented to May 4, 1910 (Chapter 33, 1910, Edward VII), provided that the bounty on rolled round wire rods should cease after the 30th day of June, 1911.

The total bounty payments on account of iron and steel made during the calendar year 1911 were \$300,750, paid on 50,125 tons of wire rods manufactured by the Dominion Iron and Steel Company, Limited.

Since 1896 a total of \$16,785,827 has been paid by the Government of Canada in bounties for the production of iron and steel, the annual payments on pig iron, puddled iron bars, steel and manufactures of steel being shown in the following table:—



**Total Bounties on Iron and Steel paid by the Government of Canada since 1896.**

Year ended.	Pig iron.	Puddled iron bars.	Steel.	Manufactures of steel.
	\$	\$	\$	\$
June 30, 1896.....	104,105	5,611	59,499	.....
" 1897.....	66,509	3,019	17,366	.....
" 1898.....	165,654	7,706	67,454	.....
" 1899.....	187,954	17,511	74,644	.....
" 1900.....	238,296	10,121	64,360	.....
" 1901.....	351,259	16,703	100,058	.....
" 1902.....	693,108	20,550	77,431	.....
" 1903.....	666,001	6,702	729,102	.....
" 1904.....	533,982	11,669	347,990	15,321
" 1905.....	624,467	7,895	676,318	231,324
" 1906.....	687,632	5,875	941,000	369,832
March 31, 1907 (9 months).....	385,231	312	575,259	338,999
" 1908.....	863,817	.....	1,092,201	347,135
" 1909.....	693,423	.....	838,100	333,691
" 1910.....	573,969	.....	695,752	538,812
" 1911.....	261,434	.....	350,456	526,858
" 1912.....	.....	.....	.....	166,750
Total.....	7,097,041	113,674	6,706,990	2,868,122

**EXPORTS AND IMPORTS OF IRON AND STEEL GOODS.**

The total value of iron and steel goods, including agricultural implements, automobiles and bicycles, exported from Canada during 1911 was \$9,907,281, as compared with a value of exports in 1910 of \$7,895,489, and in 1909 a value of \$7,172,413. Of the total exports in 1911, stoves, gas buoys, castings, machinery, and hardware contributed a total valuation of \$1,242,006; pig iron, \$271,968; scrap iron and steel, \$54,618; steel and manufactures of steel, \$769,692; agricultural implements, \$6,281,929, and automobiles and bicycles, \$1,287,068. Particularly large increases are noted in the exports of agricultural implements and of automobiles and bicycles. Details of these exportations during the past two years are shown in the accompanying table:—



IRON.—TABLE 19.

Exports of Iron and Steel Goods, the product of Canada, during the Calendar Years 1910 and 1911.

		1910.		1911.	
		Quantity.	Value.	Quantity.	Value.
			\$		\$
Stoves.....	No.	1,058	15,832	1,176	20,626
Gas buoys and parts of.....					68,485
Castings, N.E.S.....	\$		51,958		33,441
Pig iron.....	Tons.	9,763	296,310	5,870	271,968
Machinery (linotype machines).....			39,438		12,239
Machinery, N.E.S.....			301,961		431,493
Sewing machines.....	No.	17,834	188,196	18,519	218,075
Typewriters.....	"	5,970	409,326	4,771	318,935
Scrap iron and steel.....	Cwt.	233,264	171,603	84,153	54,618
Hardware, tools, etc.....	\$		88,844		94,513
Hardware, N.E.S.....	"		43,472		44,199
Steel and manufactures of.....	"		1,110,925		769,692
Agricultural implements —					
Mowing machines.....	No.	18,745	634,326	22,859	778,274
Reapers.....	"	3,411	220,517	9,385	574,315
Harvesters.....	"	11,382	1,234,794	14,355	1,432,911
Ploughs.....	"	16,888	540,677	20,437	508,095
Harrows.....	"	8,924	115,068	5,412	95,904
Hay rakes.....	"	6,344	205,342	11,085	317,842
Seeders.....	"	256	13,727	174	13,795
Thrashing machines.....	"	29	8,576	339	92,442
Cultivators.....	"			5,923	138,377
All other.....	"		1,163,722		1,533,728
Parts of.....	"		575,848		796,246
Automobiles.....	"	387	433,663	1,509	1,184,506
" parts of.....	"				45,798
Bicycles.....	"	72	2,710	90	5,936
" parts of.....	"		28,654		50,828
Total.....			7,895,489		9,907,281

A detailed statement of the imports of iron and steel, as compiled from the annual reports of Trade and Navigation, is shown in Tables 21 and 22, Table 21 showing the imports subject to duty and Table 22 showing the imports free of duty.

The total value of the imports during the fiscal year ending March, 1911, was \$85,319,541, as compared with the valuation of imports in 1910 of \$59,952,197, and \$40,393,431 during the fiscal year 1909. These imports include all classes of iron and steel goods manufactured, as well as those of a crude form. In many cases the imports of manufactured goods are given only in dollars, so that the total tonnage of imports cannot be estimated. In the case of most of the cruder materials, however, the quantities are given, and a compilation of these shows a minimum importation of iron and steel during the fiscal year ending March, 1911, of 1,284,401 tons, as compared with 915,425 tons in 1910 and 565,734 tons in 1909. A summary of these importations is shown in Table 20.

In addition to the imports of pig iron and of ferro-products which have already been referred to, this record shows an importation in 1911 of ingots,

blooms, billets, puddled bars, etc., of 48,395 tons; scrap iron and scrap steel, 53,824 tons; plates and sheets, 205,690 tons; bars, rods, hoops, bands, etc., 183,865 tons; structural iron and steel, 345,350 tons; rails and connexions, 36,690 tons; pipe and fittings, 28,831 tons; nails and spikes, 3,099 tons; wire, 64,850 tons; forgings, castings, and manufactures, 24,523 tons.

The total value of the 1,284,401 tons imported was \$33,766,865, or an average value per ton of \$26.29. Other iron and steel goods of which the weights are not recorded were imported to the value of \$51,552,676, making up the total value of \$85,319,541, shown in detail in Tables 21 and 22.

A very large proportion of these imports is derived from the United States, and it may be of interest here to quote from the records published in the 'Commerce and Navigation of the United States,' showing the exports of iron and steel goods from that country to Canada.

According to this authority there was exported to Canada from the United States during the twelve months ending June 30, 1911, 821,526 tons of iron and steel goods, valued at \$25,544,421, together with other iron and steel goods of which the weight is not given, valued at \$38,738,575, or a total value of \$64,282,996.

During the twelve months ending June 30, 1910, the corresponding exports to Canada were 574,807 tons, valued at \$19,673,740, together with other iron and steel goods to the value of \$28,153,628, or a total value of \$47,827,368. Iron ores are not included in either case.

The detailed items will be found in Table 23.

IRON.—TABLE 20.

Imports of some Iron and Steel Products of which the Weights are Available.

Material.	TWELVE MONTHS ENDING MARCH.			
	1908.	1909.	1910.	1911.
	Tons.	Tons.	Tons.	Tons.
Pig iron.....	212,290	58,591	159,506	270,102
Ferro-products and chrome steel.....	17,661	13,206	15,153	19,182
Ingots, blooms, billets, puddled bars, etc.....	21,222	8,887	36,819	48,395
Scrap iron and scrap steel.....	69,213	26,212	28,797	53,824
Plates and sheets.....	126,172	116,610	200,575	205,690
Bars, rods, hoops, bands, etc.....	98,631	73,261	117,159	183,865
Structural iron and steel.....	373,871	162,735	195,748	345,350
Rails and connexions.....	52,706	32,543	55,183	36,190
Pipe and fittings.....	25,090	18,309	16,705	28,831
Nails and spikes.....	2,741	1,611	3,476	3,099
Wire.....	57,046	39,375	68,211	64,850
Forgings, castings and manufactures.....	22,357	14,594	18,093	24,523
Total.....	1,079,000	565,734	915,425	1,284,401

Material.		TWELVE MONTHS ENDING MARCH, 1910.		TWELVE MONTHS ENDING MARCH, 1911.	
		Quantity.	Values.	Quantity.	Values.
Agricultural implements, N.O.P., viz.:	\$ No.		\$		\$
Binding attachments	156	10,069	54,392	6,296	10,022
Cultivators and weedeis	5,428	5,428	218,599	6,886	59,064
Drills, seed	71	71	29,542	118	355,821
Farm, road, or field rollers	3,639	3,639	3,553	64,305	64,305
Forks, pronged	9,004	9,004	114,586	20,882	10,018
Harrows	1,483	1,483	166,013	15,001	229,911
Harvesters, self-binding	460	460	25,119	1,110	115,794
Hay loaders	14	14	736	453	25,272
Hay feeders	9,290	9,290	1,978	9	261
Hoes	1,252	1,252	30,758	4,737	1,210
Horse rakes	8,210	8,210	870	26,967	26,967
Knives, hay or straw	148	148	173	8,213	4,517
Knives, edging	6,722	6,722	22,454	56	72
Lawn mowers	248	248	21,750	8,783	32,412
Manure spreaders	1,431	1,431	62,978	705	65,562
Mowing machines	26,695	26,695	933,716	1,367	52,999
Ploughs	2,012	2,012	2,279	52,972	1,993,214
Post hole diggers	770	770	32,225	4,213	4,368
Potato diggers	28,456	28,456	5,555	626	16,767
Rakes, N.O.P.	161	161	8,350	58,769	10,689
Reapers	2,098	2,098	10,720	827	60,677
Scythes	329	329	1,163	2,286	10,559
Sickles or reaping hooks	78	78	306	529	1,163
Snaths	15	15	30	15	30
Spades and shovels of iron or steel, N.O.P.	9,095	9,095	43,145	9,539	45,751
Spade and shovel blanks, and iron or steel cut to shape for the same	5,410	5,410	281,245	3,247	5,448
Parts of agricultural implements paying 12½ per cent and 17½ per cent.	4,474	4,474	493,714	765,844	464,202
" " " " " " " " " " " "			57,072	83,226	83,226
All other agricultural implements, N.O.P.					

Anvils and vises.....	"	.....	66,592	.....	104,670
Cart or wagon skins or boxes.....	Lbs.	132,868	9,945	229,616	9,488
Springs, N.O.P. and parts thereof, of iron or steel, for railway, tramway, or other vehicles.....	Cwt.	6,100	36,652	6,662	33,544
Axle and axle parts, N.O.P., and axle blanks and parts thereof, of iron or steel for railway, tramway, or other vehicles.....	"	40,261	164,891	58,234	214,261
Bar iron or steel, rolled, whether in coils, bundles, rod or bars, comprising rounds, ovals, squares, and flats, N.O.P.....	"	1,402,674	1,952,170	2,097,914	3,179,921
Butts and hinges N.O.P.....	\$	.....	65,783	.....	94,450
Canada plates, Russia iron,terne plate, and rolled sheets of iron and steel coated with zinc, spelter or other metal, of all widths or thicknesses, N.O.P.....	Cwt.	59,685	195,126	29,765	93,118
Castings, iron or steel, N.O.P.....	\$	.....	403,524	.....	826,365
Cast iron pipe of every description.....	Cwt.	280,891	327,175	500,920	562,008
Cast scrap iron.....	Tons	12,621	153,578	26,522	266,626
Chains, coil chain, chain links, and chain shackles of iron or steel of $\frac{5}{16}$ " diameter, and over.....	Cwt.	55,216	158,251	61,069	191,588
Chains, N.O.P.....	\$	.....	45,386	.....	94,045
Tacks, shoe.....	Lbs.	23,427	2,519	11,952	1,634
Nails, brads, spikes and tacks of all kinds, N.O.P.....	"	483,265	28,753	538,981	31,311
Engines, etc.:—	No.	99	346,090	98	297,512
Locomotives for railways.....	No.	.....	41,823	.....	64,898
Motor cars for railways and tramways.....	No.	7	7,141	8	14,119
Engines, fire.....	"	12	7,638	16	17,435
Engines, gasoline.....	"	5,617	1,000,003	9,045	1,465,035
Engines, steam.....	"	324	252,864	284	244,394
Boilers, steam.....	"	654	243,246	567	180,616
Boilers, N.O.P.....	"	1,988	120,733	1,864	138,632
Fire extinguishing machines, including sprinklers for fire protection.....	\$	.....	78,248	.....	77,007
Fittings, iron or steel, for iron or steel pipe of every description.....	Lbs.	5,321,262	357,782	7,570,757	465,954
Flat eye-bar blanks, not punched or drilled, for use exclusively in the manufacture of bridges or of steel structural work, or in car construction.....	Tons	199	5,911	137	3,800
Ferro-silicon, spiegeleisen, and ferro-manganese.....	"	14,952	332,486	18,796	461,331
Forging of iron and steel of whatever size, shape, or in whatever stage of manufacture, N.O.P., and steel shafting, turned, compressed or polished and hammered, drawn or cold rolled iron or steel bars or shapes, N.O.P.....	Lbs.	2,491,222	121,952	2,424,963	125,030
Hardware, viz.: builders, cabinet-makers, upholsterers, harness-makers, saddlers and carriage hardware, including curry-combs, N.O.P.....	\$	.....	503,939	.....	681,050
Horse, mule, and ox shoes.....	"	.....	13,797	.....	18,973
Iron or steel billets, weighing not less than 60 pounds per lineal yard.....	Cwt.	567,159	518,102	889,130	861,036
Iron or steel ingots, cogged ingots, blooms, slabs, puddled bars and loops, or other forms, N.O.P., less finished than iron or steel bars, but more advanced than pig iron, except castings.....	"	115,490	97,333	64,555	68,616
Iron or steel bridges or parts thereof, iron or steel structural work, columns, shapes, or sections, drilled, punched, or in any further stage of manufacture than as rolled or cast, N.O.P.....	"	.....	.....	.....	.....
Iron in pig.....	Tons	48,940	125,938	125,295	328,011
Iron in pig charcoal.....	"	158,910	2,118,440	254,284	3,376,843
Locks of all kinds.....	\$	596	8,695	15,818	237,088
Machines, machinery, etc.:—	No.	.....	353,243	.....	459,081
Automobiles and motor vehicles of all kinds.....	No.	1,424	1,732,215	3,488	4,235,196



## Imports of Iron and Steel Goods Subject to Duty.

Material.	TWELVE MONTHS ENDING MARCH, 1910.		TWELVE MONTHS ENDING MARCH, 1911.	
	Quantity.	Value. \$	Quantity.	Value. \$
Machines, machinery, etc.:— <i>Continued.</i>				
Automobiles and motor vehicles, parts of.....				
Fanning mills.....	881	293,586	2,246	522,223
Grain crushers.....	49	10,854	92	29,319
Windmills and complete parts thereof.....	1,036	661	1,482	2,405
Ore crushers and rock crushers, stamp mills, conish and belted rolls, rock drills, air compressors, cranes, derricks, and percussion coal cutters.....		48,310		51,805
Portable machines:—		259,311		265,035
Fodder or feed cutters.....	180	1,713	395	4,177
Horse powers for farm purposes.....	48	3,912	4	281
Portable engines with boilers in combination and traction engines for farm purposes.....	1,216	1,817,209	2,170	3,636,392
Portable sawmills and planing mills.....	13	12,303	36	17,204
Steam shovels.....	20	95,948	47	296,043
Threshing machine separators.....	1,199	623,799	1,286	741,360
Threshing machine separators, parts of, including wind-stackers, baggers, weighers and self-feeders for same, and finished parts thereof for repairs, when imported separately.....		344,329		422,044
All other portable machines, N.O.P., and parts.....		23,873		43,742
Sewing machines.....	16,430	323,249	14,968	351,525
Sewing machines, parts of.....		101,584		108,957
Machines, type-casting and type-setting, and parts thereof, adapted for use in printing offices.....	9,319	670,165	11,230	686,936
Machines, type-casting and type-setting, and parts thereof, adapted for use in printing offices.....	66	297,071	134	226,325
Machines specially designed for ruling, folding, binding, creasing, or cutting paper or card- board, when for use exclusively by printers, bookbinders, and by manufacturers of articles made from paper or cardboard, including parts thereof, composed wholly or in part of iron, steel, brass, or wood.....				
Lithographic presses and type-making accessories for same.....	310	197,004	1,015	265,810
Printing presses.....		62,000		68,631
Machinery of a class or kind not made in Canada and parts thereof adapted for carding, spinning, weaving, braiding, or knitting fibrous material, when imported by manufacturers for such purposes.....		326,185		392,873
		847,247		893,413





## Imports of Iron and Steel Goods Subject to Duty.

	TWELVE MONTHS ENDING MARCH, 1910.		TWELVE MONTHS ENDING MARCH, 1911.	
	Quantity.	Value. \$	Quantity.	Value. \$
<b>Tubing.</b> —				
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, over 4" diameter, N.O.P.		683,763		503,206
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, 4" and less in diameter, N.O.P.		332,215		394,613
Seamless steel tubing, valued at not less than 3½ cents per lb.	5,039	27,497	12,016	45,605
Rolled or drawn square tubing of iron or steel, adapted for use in the manufacture of agricultural implements.		5,942		1,894
Iron or steel pipe or tubing, plain or galvanized, riveted, corrugated or otherwise specially manufactured, including lock-joint pipe, N.O.P.		194,545		285,190
Iron or steel pipe, not butt or lap welded, and wire bound wooden pipe, not less than 30" internal diameter, when for use exclusively in alluvial gold mining.		47,488		22,599
Ware—Agate, granite, or enamelled iron or steel ware		143,374		167,693
Ware—Iron or steel hollow ware, plain black or coated, N.O.P., and nickel and aluminum kitchen or household hollow ware.		42,507		79,507
Wire bale ties.			3,514	3,575
Wire bound wooden pipe, N.O.P.		185		1,143
Wire cloth or woven wire and netting of iron and steel.		76,792	2,553,155	140,037
Wire, crucible cast steel, valued at not less than 6 cents per lb.	1,347,439	24,743	176,173	32,166
Wire screens, doors, and windows.	114,770	9,623		20,065
Wire buckhorn strip fencing, woven wire fencing, and wire fencing of iron and steel, N.O.P., not to include woven wire or netting made from wire smaller than No. 14 gauge, not to include fencing or wire larger than No. 9 gauge.				
Wire, single or several, covered with cotton, linen, silk, rubber, or other material, including cable so covered.	1,598,471	51,688	1,840,681	65,448
Wire of iron and steel all kinds, N.O.P.				
Wire rope, stranded or twisted wire clothes lines, picture or other twisted wire, and wire cables, N.O.P.	3,157,730	329,229	3,576,896	486,560
Iron or steel nuts, rivets, or bolts with or without threads, nut bolt, and hinge blank, and T and strap hinges of all kinds, N.O.P.	7,713,386	210,630	8,969,965	271,402
	5,339,334	345,756	7,525,843	530,054
	33,875	132,082	46,938	192,798

Material.

Iron or steel scrap, wrought, being waste or refuse, including punchings, cuttings, and clippings of iron or steel plates or sheets having been in actual use : crop ends of tin plate bars, blooms, and rails, the same not having been in actual use.....	302,714	191,782	617,875	408,075
Penknives, jack-knives, and pocket knives of all kinds.....	.....	74,868	.....	100,318
Knives and forks of steel, plated or not, N. O. P.....	.....	201,445	.....	263,804
All other cutlery, N. O. P.....	.....	507,612	.....	677,030
Guns, rifles, including air guns and air rifles (not being toys), muskets, cannons, pistols, revolvers, or other firearms.....	.....	377,950	.....	622,037
Bayonets, swords, fencing foils, and masks.....	.....	9,810	.....	9,810
Needles of any material or kind, N. O. P.....	.....	6,043	.....	118,783
Steel, chrome steel.....	.....	101,496	.....	30,691
Steel plate, universal mill or rolled edge plates of steel over 12" wide, imported by manufacturers of bridges or of structural work, or for use in car construction.....	4,028	17,581	7,711	.....
Steel in bars or sheets to be used exclusively in the manufacture of shovels when imported by the manufacturers of shovels.....	316,760	390,953	487,764	655,047
Roller iron or steel, or cast steel in bars, bands, hoops, scroll, or strip, sheet or plate of any size, thickness or width, galvanized or coated with any material or not, and steel blanks for the manufacture of milling cutters, when of greater value than 3½ cents per pound.....	27,723	36,437	31,121	44,546
Flat steel, cold rolled, not over ¾" thick, for the manufacture of cups and cones for ball bearings.....	71,716	415,331	106,676	621,431
Steel balls adapted for use in bearings of machinery and vehicles.....	.....	14,725	.....	15,613
Steel wood.....	396	1,429	.....	.....
Tools and implements—	126	2,418	452	2,689
Adzes, cleavers, hatchets, wedges, sledges, hammers, crowbars, cant-dogs and track tools, picks, mattocks and eyes and poles for the same.....	.....	63,078	.....	67,132
Axes.....	6,593	35,667	7,993	45,361
Saws.....	.....	80,677	.....	113,401
Files and rasps, N. O. P.....	.....	83,927	.....	121,165
Tools, hand or machine, of all kinds, N. O. P.....	.....	628,471	.....	767,628
Knife blades or blanks, and table forks of iron and steel, in the rough, not handled, filed, ground, or otherwise manufactured.....	.....	95	.....	388
Manufactures, articles or wares of iron and steel, or of which iron and steel (or either) are the component materials of chief value, N. O. P.....	.....	4,994,498	.....	7,122,976
Total.....	.....	49,850,258	.....	73,571,113

IRON.—TABLE 22.

Imports of Iron and Steel Goods Free of Duty.

Material.	TWELVE MONTHS ENDING MARCH, 1910.		TWELVE MONTHS ENDING MARCH, 1911.	
	Quantity.	Value. \$	Quantity.	Value. \$
Anchors for vessels.				
Chain, malleable sprocket or link belting.				
Cream separators, and steel bowls for.				
Cream separators—materials which enter into the construction and form part of when imported by manu- facturers of cream separators to be used in the manufacture thereof.	5,698	22,299	6,168	25,382
(as buoys—The following articles and materials, when imported by manufacturers of automatic gas buoys and automatic gas beacons, for use in the manufacture of such buoys and beacons for the Government of Canada or for export, viz., iron or steel tubes over 16" in diameter; flanged and dished steel heads made from boiler plate, over 5 feet in diameter; hardened steel balls, not less than 3" in diameter; acetylene gas lanterns and parts thereof, and tobim bronze in bars or rods.		180,839		240,704
Gun barrels, in single tubes, forged, rough bored.		585,148		387,340
Iron or steel rods over 1½" in diameter for manufacturing of chain.		227,680		396,501
Rolled iron or steel rods not over ½" in diameter or width, to be manufactured into horseshoe nails.	21,134		27,708	
Iron or steel, rolled round wire rods, in the coil, not over 3" in diameter, when imported by manu- facturers for use in making wire in the coil in their own factories.	2,917			
Boiler plate of iron or steel not less than 30" in width, and not less than ¾" in thickness, for use exclusively in the manufacture of boilers.	561,423	14,916	720,641	29,829
Flat galvanized iron or steel sheets.	307,737	27,363	319,897	1,372
Rolled iron and steel, and cast steel in bars, band, hoop, scroll or strip, sheet or plate of any size, thickness or width, galvanized or coated with any material or not, and steel blanks for the manufacture of milling cutters, when of greater value than 3½ cts. per lb.	391,076	5,602	381,797	35,461
Rolled iron or steel sheets in strips, polished or not, 14 gauge and thinner, N.O.P.				
Rolled iron or steel, hoop, band, scroll, or strip, No. 14 gauge or thinner, galvanized or coated with other metal or not, N.O.P.				
Iron tubing for manufacture of extension rods for windows.	59,261		82,746	531,804
Iron or steel, beams, sheets or plates, ankles, knees, masts or parts thereof, and cable chains for wooden, iron, steel or composite ships or vessels.	324,935	412,110	363,381	890,034
Locomotive and car wheel tires of steel in the rough.	17,936	28,413	23,881	41,143
		5,866		8,642
	113,010	173,143	283,319	417,981
	136,586	337,093	192,110	451,253



Scrap iron and scrap steel, old, and fit only to be remanufactured, being part of or recovered from any vessel wrecked in waters subject to the jurisdiction of Canada.

# Machinery:—

Articles of metals as follows when for use exclusively in mining or metallurgical operations, viz: coal cutting machines, except percussion coal cutters; coal heading machines; coal augers; rotary coal drills; cone drills; miners safety lamps and parts thereof, also accessories for cleaning, filling, and testing such lamps; electric or magnetic machines for separating or concentrating iron ores; furnaces for the smelting of copper, zinc, and nickel ores; converting apparatus for metallurgical processes in metals; copper plates, plated or not, machinery for extraction of precious metals by the chlorination or cyanide process; amalgam safes; automatic ore samplers; automatic feeders; retorts, mercury pumps; pyrometers; bullion furnaces; amalgam cleaners; blast furnace blowing engines; wrought iron tubing, butt or lap welded; threaded, or coupled or not, over 4" in diameter; and integral parts of all machinery mentioned in this item; blowers of iron or steel for use in the smelting of ores, or in the reduction, separation, or refining of metals, rotary kilns, revolving roasters, and furnaces of metal designed for roasting ore, mineral rock or clay; furnace slag trucks, and slag pots of a class or kind not made in Canada; buddles, vanners, and slime tables adapted for use in gold mining.

Appliances of iron and steel, of a class or kind not made in Canada, and elevators and machinery of floating dredges, when for use exclusively in alluvial gold mining.

Well-drilling, and apparatus of a class or kind not made in Canada for drilling for water, natural gas or oil, and for prospecting for minerals, not to include motive power.

Briquette making machines

Newspaper printing presses, of not less value by retail than \$1,500 each, of a class or kind not made in Canada.

Machinery or tools not manufactured in Canada up to the required standard necessary for any factory to be established in Canada for the manufacture of rifles for the Government of Canada.

All materials, or parts in the rough, unfinished, and screws, nuts, bands, and springs to be used in rifles to be manufactured at any such factory for the Government of Canada.

Machinery of every kind, and structural iron and steel for use in the construction and equipment of factories for the manufacture of sugar from beet root.

Machinery of a class or kind not made in Canada and parts thereof for the manufacture of twine cordage, or linen, or for the preparation of flax fibre.

Mould boards or shares, or plough plates, land slides, or other plates for agricultural implements, when cut to shape from rolled plates of steel, but not moulded, punched, polished, or otherwise manufactured.

Steel balls adapted for use on bearings on machinery, and vehicles.

Steel, rolled, for saws and straw cutters not tempered, or ground, nor further manufactured than cut to shape without indented edges.

Steel strips, and flat steel wire when imported into Canada by manufacturers of buckthorn and plain strip fencing for use exclusively in their own factories in the manufacture thereof.

Steel wire, Bessemer soft drawn spring of Nos. 10, 12, and 13 gauge, respectively, and homo steel spring wire of Nos. 11 and 12 gauge, respectively, when imported by manufacturers of wire mattresses, to be used exclusively in their own factories in the manufacture of such articles.

Steel, crucible sheet, 11 to 16 gauge,  $2\frac{3}{4}$ " to 18" wide for the manufacture of mower and reaper knives when imported by manufacturers thereof for use exclusively in the manufacture of such articles in their own factories.

800	100	1,230	730
765,564	704,878		
60,154	251,041		
120,409	209,717		
3,742	27,582		
391,657	504,556	114	
9,331	6,166		
54,068	50,067		
51,292	29,903		
16,351	43,129		
289,044	512,857	164,052	
3,688	3,206		
158,438	181,806	22,896	
19,145		8	32
19			
8,610	21,885	9,173	22,831
13,830	55,095	14,118	57,518



## Imports of Iron and Steel Goods Free of Duty.

Material.	TWELVE MONTHS ENDING MARCH, 1910.		TWELVE MONTHS ENDING MARCH, 1911.	
	Quantity.	Value. \$	Quantity.	Value. \$
Steel No. 20 gauge and thinner, but not thinner than 30 gauge, for the manufacture of corset steels, clock springs, and shoe shanks, imported by manufacturers of such articles for exclusive use in the manufacture of such articles in their own factories.....				
Steel wire, flat, of 16 gauge or thinner, imported by the manufacturers of crinoline, and corset wires and dress stays, for use exclusively in the manufacture of such articles in their own factories.....	87	360	1,118	2,771
Steel, No. 12 gauge and thinner, but not thinner than No. 30 gauge, for the manufacture of buckle clasps, bed fasts, furniture casters, and ice-creepers, imported by the manufacturers of such articles, for use exclusively in the manufacture of such articles in their own factories.....	12,950	46,665	6,286	40,240
Steel, No. 24 and 17 gauge, in sheets 63" long and from 18" to 32" wide, when imported by the manufacturers of tubular bow sockets for use exclusively in the manufacture of such articles in their own factories.....	3,123	7,859	4,704	14,268
Steel springs for the manufacture of surgical trusses, when imported by manufacturers of surgical trusses for use exclusively in the manufacture thereof in their own factories.....	1,565	3,090	1,440	3,132
Swedish rolled iron, and Swedish rolled steel nail rods, under half an inch in diameter, for the manufacture of horse-shoe nails.....	2,265	479	1,200	438
Steel seamless tubing valued at not less than 3½ cents per pound.....	19,208	39,313	20,420	47,039
Steel rolled or drawn square tubing adapted for use in the manufacture of agricultural implements.....	1,448	11,758	2,751	20,015
Steel or iron tubes, rolled, not joined or welded, not more than 1½" diameter, N.O.P.....		163		
Seamless steel, or wrought iron boiler tubes, including flues and corrugated tubes for marine boilers.....		11,459		17,777
Steel imported by manufacturers of rifles for use in manufacturing rough parts of rifles, when such parts are to be used in rifles for the Government of Canada.....		52,290		573,579
Barbed fencing wire of iron or steel.....		4,180		
Wire, crucible cast steel, valued at not less than 6 cents per pound.....	351,576	765,427	345,108	743,527
Wire, curved or not, galvanized iron or steel, Nos. 9, 12, and 13 gauge.....	6,264	1,450	16,939	2,479
Wire, steel, valued at not less than 2½ cents per pound when imported by manufacturers of rope for use exclusively in the manufacture of rope.....	763,538	1,524,742	637,593	1,243,580
	34,765	136,715	46,311	180,832
Total.....		10,101,939		11,448,428

## IRON.—TABLE 23.

## Imports of Iron and Steel into Canada from the United States.\*

Material.	TWELVE MONTHS ENDING JUNE 30, 1910.		TWELVE MONTHS ENDING JUNE 30, 1911.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
Pig iron.....Short tons	75,270·7	1,135,509	145,867·7	2,090,722
Scrap and old, fit only for remanufacture "	14,071·6	195,316	48,349·3	609,191
Bar iron....."	5,802·7	216,228	11,157·7	363,283
<i>Bars or Rods of Steel—</i>				
Wire rods....."	27,736	781,335	19,825·9	527,306
All other....."	75,050·9	2,390,235	92,268·0	2,322,424
Billets, ingots, and blooms of steel.. "	14,395	306,268	56,433·4	1,113,957
Hoop, band, and scroll....."	4,617·5	200,655	†	†
Steel rails for railways....."	30,525·6	801,084	43,752·8	1,168,101
Sheets and plates (iron)....."	25,290	1,264,985	23,894·2	1,139,918
Sheets and plates (steel)....."	128,277	4,875,466	174,055·9	6,437,314
Sheets and plates (tin plates, terne plates, and taggers tin)....."	11,892·6	826,929	23,008·8	1,607,458
Structural iron and steel....."	74,574	2,828,338	89,201·3	3,496,033
Wire (barbed)....."	18,202·5	839,818	16,182	707,893
Wire (all other)....."	29,950	1,296,835	35,097·6	1,483,075
<i>Nails and Spikes—</i>				
Cut....."	1,097·5	39,085	1,854·9	56,034
Wire....."	693·5	37,452	376	22,968
All other, including tacks....."	328	20,021	845·9	56,163
Pipes and fittings....."	37,031·9	1,618,181	36,264·4	1,640,592
Radiators and cast iron house heating boilers....."	†	†	3,090·6	201,989
	574,807·0	19,673,740	821,526·4	25,544,421

\* Compiled from "Commerce and Navigation of the United States, 1911," Washington, D.C.

† Included in "all other manufactures of" in 1910.

+ " " " " 1911.

Table continued on next page.

IRON.—TABLE 23—Continued.

## Imports of Iron and Steel into Canada from the United States.

Material.	1910.		1911.	
	Quantity.	Value.	Quantity.	Value.
		\$		\$
<i>Builders Hardware and Tools—</i>				
Locks, hinges, and other builders hardware		1,272,969		1,560,793
Saws		203,262		283,785
Tools not elsewhere specified		1,025,979		1,417,144
Car wheels	No. 6,592	66,505	5,976	71,588
Castings, not elsewhere specified		904,412		1,439,080
<i>Cutlery—</i>				*
Table		12,226		
All other		109,039		123,231
Firearms		305,016		416,129
<i>Machinery, Machines, and parts of—</i>				
Adding machines		†		320,326
Brewers' machinery		†		112,405
Cash registers	No. 724	45,260	2,268	197,597
Electrical machinery		1,151,449		1,664,668
Laundry machinery		124,325		139,008
Metal working machinery (including metal working machine tools)		336,172		766,127
Mining machinery		734,631		912,270
Printing presses and parts of		756,493		1,057,876
Pumps, and pumping machinery		456,358		634,343
Refrigerating machinery, ice-making machinery, etc.		†		73,193
Sewing machines and parts of		462,128		436,059
Shoe machinery		228,421		266,998
Steam engines and parts of (fire)	No. 16	7,199	†	†
Steam engines and parts of (locomotive)	" 65	247,979	69	345,618
Steam engines and parts of (stationary)	" 3,173	840,418	4,016	852,685
Steam engines and parts of (traction)	" 1,296	2,094,247	1,590	2,743,147
Steam engines and parts of (all other engines and parts of engines)	"	1,366,650		1,585,231
Sugar-mill machinery		†		4,883
Typewriting machines and parts of		430,737		647,152
Windmills and parts of		40,041		78,692
Wood working machinery		349,094		454,596
All other	No. 2,960	7,343,794		10,383,946
Safes		136,684	3,967	209,092
Scales and balances		109,181		138,674
Stoves, ranges, and parts of		635,900		832,447
All other manufactures of		6,357,049		8,569,792
		28,153,628		38,738,575
Total value		47,827,368		64,282,996

\* In 1911, included in "all other cutlery."

† In 1911, included in "locomotive."

† In 1910, included in "all other machinery."

## LEAD.

The following statistics of the production of lead in Canada in 1911 are based on direct smelter returns and represent the amount of lead refined in Canada and shipped as pig lead or manufactured products.

The 1911 output was almost entirely from the mines of British Columbia, and a considerable decrease is shown, the production being 23,784,969 pounds in that year, against 32,987,508 for 1910. A small shipment was made from Quebec, but in regard to this figures are not obtainable.

In valuing the lead production for 1911, the average price per pound at Montreal has been used. The New York market is practically closed to Canadian lead by high tariff, and to the London market price must be added the freight, etc., to reach the Canadian market. The price at Montreal or Toronto is lower than that at New York, and higher than that at London, and is probably a more equitable valuation to place upon the Canadian production.

Statistics showing the lead production since 1887 are given in the following table:—

LEAD.—TABLE 1.  
Annual Production.

Calendar Year.	Lbs.	Price per lb.	Value.	Calendar Year.	Lbs.	Price per lb.	Value.
		Cts.	\$			Cts.	\$
1887.....	204,800	5·400	9,216	1900....	63,169,821	4·370	2,760,521
1888.....	674,500	4·420	29,812	1901.....	51,900,958	4·334	2,249,387
1889.....	165,100	3·930	6,488	1902.....	22,956,381	4·069	934,095
1890.....	105,000	4·480	4,704	1903.....	18,139,283	4·237	768,562
1891.....	88,665	4·350	3,857	1904.....	37,531,244	4·309	1,617,221
1892.....	808,420	4·090	33,064	1905.....	56,864,915	4·707	2,676,632
1893.....	2,135,023	3·730	79,636	1906.....	54,608,217	5·657	3,089,187
1894.....	5,703,222	3·290	187,636	1907....	47,738,703	5·325	2,542,086
1895.....	16,461,794	3·230	531,716	1908.....	43,195,733	4·200	1,814,221
1896.....	24,199,977	2·980	721,159	1909.....	45,857,424	*3·690	1,692,139
1897.....	39,018,219	3·580	1,396,853	1910.....	32,987,508	3·687	1,216,249
1898.....	31,915,319	3·780	1,206,399	1911.....	23,784,969	†3·480	827,717
1899.....	21,862,436	4·470	977,250				

\* In 1909 and 1910, average prices at Toronto as quoted by *Hardware and Metal*; in previous years average prices at New York, as quoted by *Engineering and Mining Journal*.

† 1911 average price at Montreal. Quotations furnished by Messrs. Thos. Robertson & Co., Montreal, Que.

Previous to 1904, lead ores mined in Canada were either exported as ore, or smelted in Canadian furnaces and exported in the form of base bullion to be refined abroad. A lead refinery employing the Bett's Electrolytic Process is now operated at Trail, B.C., in connexion with the smelter there, and has witnessed frequent enlargements until it is now treating the base bullion pro-

duced from the smelting of practically all the British Columbia lead ores by the Trail smelter.

Pig lead, fine gold, fine silver, refined antimony, copper sulphate, and babbitt metal are produced at the refinery, and lead pipe is also manufactured there. The refined lead finds a market in Canada, the United States, and the Orient. Of that used in Canada a great part is consumed in the manufacture of white lead, for which the Trail product is especially valuable on account of its purity.

The production of refined lead, including pig lead and lead pipe, etc., has been as follows:—

Year.	Refined lead produced.	Year.	Refined lead produced.
1904.....	7,519,440	1908.....	36,549,274
1905.....	15,804,509	1909.....	41,883,614
1906.....	20,471,314	1910.....	32,987,508
1907.....	26,607,461	1911.....	23,784,969

The price of lead in London averages from  $\frac{1}{2}$  to 2 cents per pound lower than in New York.

The average price for soft lead in 1911, on the London market, was £13 19s. 3d. per long ton (equivalent to 2.992 cents per pound), as compared with £12 19s. (2.775 cents per pound) in 1910, and £13 1s. 8d. (2.803 cents per pound), in 1909.

The price of lead on the Canadian market at Montreal is intermediate between the New York and London values. Montreal is the main Canadian market. The Toronto price in winter is about the same as that at Montreal but the latter falls during the period of summer freight rates about 10 cents per 100 pounds below the former.

The average price of lead in Montreal in 1911 was 3.480 cents per pound, against 2.992 in London and 4.420 in New York.

The monthly and yearly average prices of lead in Montreal for the past five years are given in the following table:—



## Price of Pig Lead at Montreal.\*

Month.	1907.	1908.	1909.	1910.	1911.
January.....	4·94	3·67	3·35	3·48	3·31
February.....	4·88	3·60	3·38	3·40	3·32
March.....	4·92	3·54	3·42	3·34	3·34
April.....	4·92	3·44	3·35	3·21	3·26
May.....	4·84	3·21	3·26	3·13	3·20
June.....	4·93	3·11	3·23	3·15	3·27
July.....	4·98	3·17	3·12	3·13	3·33
August.....	4·69	3·31	3·08	3·11	3·45
September.....	4·85	3·24	3·14	3·11	3·63
October.....	4·56	3·29	3·26	3·23	3·77
November.....	4·25	3·42	3·28	3·31	3·93
December.....	3·65	3·37	3·34	3·35	3·95
Average.....	4·701	3·364	3·268	3·246	3·480

\*Producers prices for car-load quantities ex cars Montreal as furnished by Messrs. Thos. Robertson & Co., Ltd., of Montreal.

The average monthly prices of lead in New York as quoted in the 'Engineering and Mining Journal' are shown in the next table.

## Monthly Average Prices of Lead in New York, in cents per pound.

Month.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.
January.....	4·35	4·000	4·075	4·347	4·552	5·600	6·000	3·691	4·175	4·700	4·483
February.....	4·35	4·075	4·075	4·375	4·450	5·464	6·000	3·725	4·018	4·613	4·440
March.....	4·35	4·075	4·442	4·475	4·470	5·350	6·000	3·838	3·986	4·459	4·394
April.....	4·35	4·075	4·567	4·475	4·500	5·404	6·000	3·993	4·168	4·376	4·412
May.....	4·35	4·075	4·325	4·423	4·500	5·685	6·000	4·253	4·287	4·315	4·373
June.....	4·35	4·075	4·210	4·196	4·500	5·750	5·760	4·466	4·350	4·343	4·435
July.....	4·35	4·075	4·075	4·192	4·524	5·750	5·288	4·447	4·321	4·404	4·499
August.....	4·35	4·075	4·075	4·111	4·665	5·750	5·250	4·580	4·363	4·400	4·500
September.....	4·35	4·075	4·243	4·200	4·850	5·750	4·813	4·515	4·342	4·400	4·485
October.....	4·35	4·075	4·375	4·200	4·850	5·750	4·750	4·351	4·341	4·400	4·265
November.....	4·35	4·075	4·218	4·200	5·200	5·750	4·376	4·330	4·370	4·442	4·298
December.....	4·15	4·075	4·162	4·600	5·422	5·900	3·658	4·213	4·560	4·500	4·450
Average.....	4·33	4·069	4·237	4·301	4·707	5·657	5·325	4·200	4·273	4·446	4·420

The average monthly prices of soft lead in London, England, as published by Julius Matton of London, and 'Metallgesellschaft' of Frankfort-on-the-Main, were, from 1902 to 1911, as follows:—

**Average Monthly Prices of Lead in London, £ per long ton.**

Month.	1902.			1903.			1904.			1905.			1906.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January .....	10	11	4	11	6	1	11	11	2	12	17	6	16	17	6
February .....	11	12	4	11	14	2	11	11	10	12	9	3	16	0	4
March .....	11	10	2	13	4	6	12	..	9	12	5	11	15	17	9
April .....	11	11	11	12	8	1	12	5	1	12	13	2	15	16	6
May .....	11	12	..	11	16	..	11	15	11	12	15	3	16	13	6
June .....	11	5	5	11	8	9	11	10	5	13	..	..	16	15	6
July .....	11	4	8	11	7	8	11	13	4	13	12	2	16	11	7
August .....	11	2	5	11	2	11	11	14	9	13	19	2	17	1	3
September .....	10	17	10	11	3	4	11	15	9	13	19	..	18	4	4
October .....	10	14	11	11	2	2	12	3	9	14	13	7	19	7	9
November .....	10	14	4	11	2	2	12	17	10	15	6	9	19	5	6
December .....	10	15	1	11	3	7	12	15	6	17	1	..	19	12	6
Yearly average .....	11	5	3	11	11	7	11	19	8	13	14	5	17	7	..

Month.	1907.			1908.			1909.			1910.			1911.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January .....	19	16	8	14	10	6	13	3	6	13	3	11	13	..	8
February .....	19	11	6	14	5	6	13	5	5	13	7	3	13	1	11
March .....	19	14	7	14	1	4	13	8	8½	13	2	9	13	2	11
April .....	19	16	4	13	13	10	13	7	..	12	13	9	12	18	5
May .....	19	17	7	13	2	7	13	5	3	12	11	8	12	19	2
June .....	20	6	..	12	15	7	13	2	4	12	13	9	13	5	5
July .....	20	8	2	12	19	6	12	13	3	12	11	8	13	10	11
August .....	19	£	3	13	9	10½	12	10	6	12	10	10	14	1	4
September .....	19	17	6	13	3	6	12	15	3	12	12	6	14	15	1
October .....	18	13	..	13	7	3	13	4	4	13	2	..	15	6	1
November .....	17	4	11	13	12	2	13	1	4½	13	4	6	15	15	5
December .....	14	9	4	13	3	6	13	2	11½	13	3	9	15	13	4
Yearly average .....	19	1	10	13	10	5	13	1	8	12	19	..	13	19	3

*Bounties.*—In 1901, and again in 1903, the Dominion Government, to encourage the lead industry, authorized the payment of a bounty on the production of lead. The Act of 1903 provided for the payment under certain restrictions of 75 cents per hundred pounds on lead contained in ore mined and smelted in Canada, provided that when the standard price of pig lead in London, England, exceeded £12 10s. per ton of 2,240 pounds, such bounty should be reduced proportionately by the amount of such excess. Thus, when the price of lead in London rose to £16 or over per long ton, the bounty ceased. As the price of lead exceeded £16 sterling on the London market for a considerable period during 1906 and 1907 the bounty paid during those years was comparatively small.

The Act of 1903 provided that payment of bounty should cease on June 30, 1908, and as only a portion of the funds provided had been used, a new Act was passed in the latter year providing for further bounty payments at the rate of 75 cents per hundred pounds, or approximately £3 10s. per ton of 2,240 lbs., subject to the restriction that when the price of lead in London exceeds £14 10s. the bounty shall be reduced by such excess.

The Act, together with the regulation based upon it, is reproduced herewith in full.

## ACT 7-8 EDWARD VII., CHAPTER 43.

### AN ACT RESPECTING THE PAYMENT OF BOUNTIES ON LEAD CONTAINED IN LEAD-BEARING ORES MINED IN CANADA.

*Assented to July 20th, 1908.*

Whereas under the provisions of an Act passed on the 24th day of October, 1903, being chapter 31 of the Acts of 1903, payment of a bounty on lead contained in lead-bearing ores mined in Canada, not to exceed five hundred thousand dollars in any fiscal year, was authorized to be paid until the thirtieth day of June, 1908, and whereas the total amount of bounty paid thereunder up to the thirty-first day of March, 1908, was six hundred and sixty-seven thousand four hundred and four dollars, and it is estimated that a further amount of forty-five thousand dollars will be payable on or before the thirtieth day of June, 1908, leaving unexpended about one million seven hundred and eighty-eight thousand and seventy-eight dollars of the total amount authorized to be paid under the provisions of the said chapter 31: Therefore, His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. The Governor in Council may authorize the payment of a bounty of seventy-five cents per one hundred pounds on lead contained in lead-bearing ores mined in Canada, on and after the first day of July, 1908, such bounty to be paid to the producer or vendor of such ores; Provided that the sum to be paid as such bounty shall not exceed five hundred thousand dollars in any year ending on the thirtieth day of June: Provided also that when it appears to the satisfaction of the Minister charged with the administration of this Act that the standard price of pig lead in London, England, exceeds fourteen pounds ten shillings sterling per ton of two thousand two hundred and forty pounds, such bounty shall be reduced by the amount of such excess.

The total amount of bounty payable under the provisions of chapter 31 of the Acts of 1903, and of this Act, shall not exceed two million five hundred thousand dollars.

2. Payment of the said bounty may be made from time to time to the extent of sixty per cent upon smelter returns showing that the ore has been delivered for smelting at a smelter in Canada. The remaining forty per cent may be

paid at the close of the fiscal year, upon evidence that all such ore has been smelted in Canada.

If at the close of any year it appears that during the year the quantity of lead produced, on which the bounty is authorized, exceeds thirty-three thousand three hundred and thirty-three tons of two thousand pounds, the rate of bounty shall be reduced to such sum as will bring the payments for the year within the limit mentioned in section 1.

3. If at any time it appears to the satisfaction of the Governor in Council that the charges for transportation and treatment of lead ores in Canada are excessive, or that there is any discrimination which prevents the smelting of such ores in Canada on fair and reasonable terms, the Governor in Council may authorize the payment of bounty at such reduced rates as he deems just, on the lead contained in such ores mined in Canada and exported for treatment abroad.

4. If at any time it appears to the satisfaction of the Governor in Council that products of lead are manufactured in Canada direct from lead ores mined in Canada without the intervention of the smelting process, the Governor in Council may make such provision as he deems equitable to extend the benefits of this Act to the producers of such ores.

5. The bounties payable under the provisions of this Act shall cease and determine on the thirtieth day of June, one thousand nine hundred and thirteen.

6. The Governor in Council may make regulations for carrying out the intention of this Act.

REGULATIONS under the provisions of the Act 7-8, Edward VII, Chapter 43, intituled: "An Act to provide for the payment of Bounty on Lead contained in the lead-bearing ores mined in Canada."

(As authorized by Order in Council on the 3rd August, 1908.)

1. The Minister of Trade and Commerce is charged with the administration of this Act.

2. All producers or vendors of lead-bearing ores who desire to avail themselves of the provisions of the Act above quoted, and to be paid bounty, shall, before making claim for such bounty, notify the Minister of their intention to claim under the provisions of the Act, and shall declare the name of the mine producing such ore, its situation, the names of the President, Secretary, and Manager, as well as the name of the official authorized to make claim. Notice shall be given the Minister of changes in ownership and management. Where the bounty is claimed by Lessees, the consent of the owner shall be shown.

3. All claims for the payment of bounty shall be made and substantiated under the oath of the Manager of the mine, or of the official authorized to make the claim.

4. Claims may be made monthly, that is immediately after the close of each calendar month, and be in such form, and contain such **evidence**, as may seem to the Minister from time to time necessary.



5. No claims made otherwise than in conformity with these regulations, and in form required by the Minister, shall be recognized, allowed or paid by the Minister.

6. The smelting of all such ores shall at all times be under the supervision of the officer of the Department of Trade and Commerce, appointed or detailed for the purpose.

7. The supervising officer may at any time demand and receive a portion of the floor sample of any ore delivered at the smelter for smelting purposes.

8. The rate of bounty shall be computed according to the London quotation upon the day the ore is taken into stock at the smelter, such day not to be later than the last day of the calendar month during which the ore was unloaded from cars at smelter grounds.

9. The lead contents of ores shall for the purpose of this Act be ascertained by fire assay, as used in ordinary commercial assaying.

10. The books of the claimants, and those of the smelting works at which the ore is smelted, shall be at all times open to the inspection of such supervising officer, and of any officer of the Department of Trade and Commerce who may be detailed by the Minister for the purpose.

11. All claims shall be substantiated by the oath of the Manager of the Smelting Works at which the ores are smelted, and shall be verified and certified to by the officer of the Department of Trade and Commerce, appointed to supervise the smelting at the works where it has been carried on.

12. The cost of the supervision shall be paid by the claimants and may be deducted *pro rata* according to the quantity smelted during the fiscal year from the amount payable to such claimants at the close of each fiscal year."

#### Statement of Bounties paid on Lead during the fiscal years 1899 to 1912.

Year ending.	Bounty paid.	Year ending.	Bounty paid.
	\$		\$
June 30, 1899.....	76,665	March 31, 1907 (9 mos.).....	1,995
" 30, 1900.....	43,335	" 31, 1908.....	51,001
" 30, 1901.....	30,000	" 31, 1909.....	307,433
" 30, 1902.....		" 31, 1910.....	340,542
" 30, 1903.....	4,380	" 31, 1911.....	248,534
" 30, 1904.....	195,627	" 31, 1912.....	179,288
" 30, 1905.....	330,645		
" 30, 1906.....	90,196	Total.....	1,899,641

*Exports and Imports.*—According to Trade and Navigation reports, the total quantity of lead contained in ore and concentrates, and pig lead, exported, during the calendar year 1911, was 137,061 pounds, valued at \$4,632, as compared with 7,759,053 pounds, valued at \$249,482, in 1910.

Details of exports, 1908 to 1911, are as follows:—



## Exports of Lead, 1908 to 1911.

	LEAD IN ORE, CONCENTRATES, ETC.		PIG LEAD.	
	Lbs.	Value.	Lbs.	Value.
		\$		\$
1908.				
To United States..	719,086	20,514	168,866	5,329
To other countries..	3,792,845	132,880	13,773,797	463,731
Total .....	4,511,931	153,394	13,942,663	469,060
1909.				
To United States.....	6,096,852	126,478	280	8
To other countries.....	129,216	6,100	11,301,680	361,056
Total .....	6,226,068	132,578	11,301,960	361,064
1910.				
To United States.....	46,800	1,308	59,605	2,295
To other countries.....			7,652,648	245,879
Total .....	46,800	1,308	7,712,253	248,174
1911.				
To United States.....	65,100	1,826	71,961	2,806
To other countries.....				
Total .....	65,100	1,826	71,961	2,806

The exports of lead since 1873 are shown in Table 2:—

LEAD.—TABLE 2.

## Exports of Lead.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1873.....		1,993	1893.....		3,099
1874.....		127	1894.....	5,792,700	144,509
1875.....		7,510	1895.....	23,075,892	435,071
1876.....		66	1896.....	26,480,320	462,095
1877.....		720	1897.....	43,802,697	925,144
1878.....			1898.....	37,375,678	885,485
1879.....		230	1899.....	15,799,518	466,950
1880.....			1900.....	57,642,029	1,917,690
1881.....			1901.....	45,590,995	1,804,687
1882.....		32	1902.....	17,761,484	457,170
1883.....		5	1903.....	18,624,303	426,466
1884.....		36	1904.....	25,868,823	559,461
1885.....			1905.....	41,657,403	1,046,541
1886.....			1906.....	21,436,022	736,007
1887.....		724	1907.....	25,591,883	1,029,898
1888.....		18	1908.....	18,454,594	622,454
1889.....		18	1909.....	17,528,028	493,642
1890.....			1910.....	7,759,053	249,482
1891.....		5,000	1911.....	137,061	4,632
1892.....		2,509			

The principal imports of lead during the calendar years 1909, 1910, and 1911, were as follows:—

	Cal. year 1909.		Cal. year 1910.		Cal. year 1911.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
Old, scrap, pig, and block.....	5,649	184,572	6,030	346,516	9,989	495,923
Bars and sheets.....	671	44,073	885	45,674	1,542	55,458
Pipe.....	71	4,884	202	15,365	256	19,426
Shot and bullets.....	5	489	3	311	4	1,053
Manufactures of lead.....		102,370		107,688		108,012
Tea lead.....	1,113	116,461	1,186	117,399	1,344	134,160
Litharge.....	852	58,100	777	56,049	899	65,743
Total ..	7,822	510,949	9,083	689,002	14,034	879,775
Metallic lead contained in imported lead pigments.....	1,514	.....	1,461	.....	1,597	169,501
	9,336	.....	10,544	.....	15,631	1,049,276

Statistics of the annual imports since 1880 of lead and manufactures of lead, are shown in Tables 3 and 4; imports of litharge in Table 5; and imports of dry white and red lead in Table 6.

LEAD.—TABLE 3.

## Imports of Lead.

Fiscal Year.	OLD, SCRAP, AND PIG.		BARS, BLOCKS, SHEETS.		TOTAL.	
	Cwt.	Value.	Cwt.	Value.	Cwt.	Value.
		\$		\$		\$
1880					30,298	124,117
1881	16,236	56,919	18,222	70,744	34,458	127,663
1882	36,655	120,870	10,540	35,728	47,195	156,598
1883	48,680	148,759	8,591	28,785	57,371	177,544
1884	39,409	103,413	9,704	28,458	49,113	131,871
1885	36,166	87,038	9,362	24,396	45,468	111,434
1886	39,945	110,947	9,793	28,948	49,738	139,895
1887	61,160	173,477	14,153	41,746	75,313	215,223
1888	68,678	196,845	14,957	45,900	83,635	242,745
1889	74,223	213,132	14,173	43,482	88,396	256,614
1890	101,197	283,096	19,083	59,484	120,280	342,580
1891	86,382	243,033	15,646	48,220	102,028	291,253
1892	97,375	254,384	11,299	32,368	108,674	286,752
1893	94,485	215,521	12,403	32,286	106,888	247,807
1894	70,223	149,440	8,486	20,451	78,709	169,891
1895	67,261	139,290	6,739	16,315	74,000	155,605
1896	72,433	173,162	8,575	23,169	81,008	196,331
1897	65,279	158,381	10,516	29,175	75,795	187,556

	OLD, SCRAP, PIG, AND BLOCK. *		BARS AND SHEETS †		TOTAL.	
1898	88,420	260,779	22,214	39,041	110,634	299,820
1899	114,659	283,432	44,796	39,833	159,455	323,265
1900	62,361	207,819	15,493	53,506	77,854	251,325
1901	(a) 85,321	97,011	16,295	78,316	101,616	175,327
1902	(a) 122,279	104,672	18,596	49,261	140,875	153,933
1903	(a) 98,530	67,821	11,535	35,398	110,065	103,219
1904	(a) 94,602	121,165	14,102	39,644	108,704	160,809
1905	(a) 57,074	133,775	17,792	51,972	74,866	185,747
1906	82,729	271,105	16,106	57,185	98,835	328,290
1907	79,575	277,470	13,710	56,630	93,285	334,100
1908	63,921	284,604	17,253	75,186	81,174	359,790
1909	50,110	151,173	13,754	46,093	63,864	197,266
1910	113,249	191,971	11,446	37,004	124,695	228,975
1911	116,655	334,159	15,587	55,312	132,242	389,471

\* Duty 15 per cent.

† Duty 25 per cent.

(a) Includes Canadian lead ore sent to the United States for refining, imported at price of refining only.

LEAD.—TABLE 4.

## Imports of Lead Manufactures.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1880.....	\$ 15,400	1891.....	\$ 23,898	1902.....	\$ 120,020
1881.....	22,629	1892.....	22,636	1903.....	134,151
1882.....	17,282	1893.....	33,783	1904.....	129,093
1883.....	25,556	1894.....	29,361	1905.....	147,177
1884.....	31,361	1895.....	38,015	1906.....	163,793
1885.....	36,340	1896.....	50,722	1907.....	162,425
1886.....	33,078	1897.....	60,735	1908.....	243,926
1887.....	19,140	1898.....	63,179	1909.....	213,167
1888.....	18,816	1899.....	91,497	1910.....	234,930
1889.....	16,315	1900.....	104,736	1911.....	235,248
1890.....	25,600	1901.....	107,260		

LEAD.—TABLE 5.

## Imports of Litharge.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
1880.....	3,041	\$ 14,334	1891.....	7,979	\$ 27,613	1902.....	13,002	\$ 47,021
1881.....	6,126	22,129	1892.....	10,384	34,343	1903.....	13,921	47,761
1882.....	4,900	16,651	1893.....	7,685	24,401	1904.....	9,894	32,633
1883.....	1,532	6,173	1894.....	38,547	28,685	1905.....	17,865	57,736
1884.....	5,235	18,132	1895.....	11,955	32,953	1906.....	10,165	39,836
1885.....	4,990	16,156	1896.....	10,710	32,817	1907.....	11,311	49,183
1886.....	4,928	16,063	1897.....	12,028	34,538	1908.....	19,052	90,785
1887.....	6,397	21,865	1898.....	10,446	32,904	1909.....	12,117	43,597
1888.....	7,010	23,808	1899.....	9,530	32,518	1910.....	18,101	62,174
1889.....	8,089	31,082	1900.....	9,139	29,176	1911.....	16,543	59,987
1890.....	9,453	31,401	1901.....	11,132	51,944			

The imports of white and red lead and orange mineral, in 1911, amounted to 4,072,433 pounds, valued at \$169,501. In 1903, the imports were 19,208,786 pounds, the falling off being due to the establishment of corroding works at Montreal.

Detailed statistics of imports of lead pigments during the calendar years 1909, 1910, and 1911, are as follows; the statistics of imports since 1885 being shown in Table 6:—

## Imports of White and Red Lead in 1909, 1910, and 1911.

	CALENDAR YEAR 1909.		CALENDAR YEAR 1910.		CALENDAR YEAR 1911.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
		\$		\$		\$
Lead, white, dry .....	2,690,575	95,894	2,076,629	75,465	1,467,193	58,335
Lead, white, ground in oil .....	730,001	32,678	811,510	37,475	1,033,732	46,986
Lead, red, dry and orange mineral .....	516,032	25,341	881,788	31,803	1,571,508	64,180
	3,936,608	153,913	3,769,927	144,741	4,072,433	169,501

LEAD.—TABLE 6.

## Imports of Dry White and Red Lead and Orange Mineral, and White Lead Ground in Oil.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1885.....	5,540,753	198,913	1899.....	14,507,945	514,842
1886.....	6,703,077	213,258	1900.....	14,679,920	634,492
1887.....	6,998,820	233,725	1901.....	10,241,601	461,368
1888.....	6,361,334	216,654	1902.....	15,584,164	603,582
1889.....	7,066,465	267,236	1903.....	19,208,786	758,371
1890.....	10,859,672	381,959	1904.....	16,925,585	662,098
1891.....	8,560,615	337,407	1905.....	17,376,588	638,381
1892.....	10,288,766	351,686	1906.....	10,412,891	417,444
1893.....	10,865,183	364,680	1907.....	5,956,626	290,629
1894.....	10,958,170	353,053	1908.....	7,830,860	420,537
1895.....	8,780,052	282,353	1909.....	4,687,416	195,258
1896.....	11,711,496	367,569	1910.....	3,585,921	141,114
1897.....	10,310,463	347,539	1911.....	3,967,091	161,897
1898.....	12,682,808	448,659			

The production of refined lead as already shown was, in 1911, 11,892 tons; while the exports of lead were 69 tons, leaving 11,823 tons as the consumption of Canadian lead.

The imports of lead during the calendar year 1911 are shown above to have been 15,631 tons, not including certain manufactures of lead valued at \$108,012, so that the total consumption of lead in 1911 probably exceeded 27,500 tons.

## Nova Scotia.

There was no production from this Province during the year. Some prospecting and development were done near Musquodoboit.



**Quebec.**

A small shipment is reported from Calumet island, but no details are obtainable.

**Ontario.**

There has been no production from this Province during the year, but the reopening of some of the older mines gives promise of a production in the future.

**British Columbia.**

As already stated almost all the production in 1911 was from British Columbia mines, and there was a decrease from the previous year as shown by Table 7 following:—

LEAD.—TABLE 7.

**British Columbia:—Production.**

Calendar Year.	Lbs.	Value.	Price per pound.	Calendar Year.	Lbs.	Value.	Price per pound.
		\$	Cts.			\$	Cts.
1887.....	204,800	9,216	4·40	1900.....	63,158,621	2,760,031	4·370
1888.....	674,500	29,813	4·42	1901.....	51,582,906	2,235,603	4·334
1889.....	165,100	6,488	3·93	1902.....	22,536,381	917,005	4·069
1890.....	Nil.			1903.....	18,089,283	766,443	4·237
1891.....	Nil.			1904.....	36,646,244	1,579,086	4·309
1892.....	808,420	33,064	4·09	1905.....	56,580,703	2,663,254	4·707
1893.....	2,131,092	79,490	3·73	1906.....	52,408,217	2,964,733	5·657
1894.....	5,703,222	187,636	3·29	1907.....	47,738,703	2,542,086	5·325
1895.....	16,461,794	531,716	3·23	1908.....	43,195,733	1,814,221	4·200
1896.....	24,199,977	721,159	2·98	1909.....	45,857,424	1,692,139	*3·690
1897.....	38,841,135	1,390,513	3·58	1910.....	32,987,508	1,216,249	3·687
1898.....	31,693,559	1,198,017	3·78	1911.....	23,784,969	827,717	†3·480
1899.....	21,862,436	977,250	4·470				

\* Average prices at Toronto for years 1909 and 1910. For previous years average prices at New York.

† Average price at Montreal. Quotations furnished by Messrs. Thos. Robertson & Co., Montreal, Que.

## LEAD.—TABLE 8.

## British Columbia:—Production by Districts.\*

—	1905.	1906.	1907.	1908.	1909.	1910.	1911.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Cassiar. ....	5,500					1,695	238,578
East Kootenay—							
Fort Steele. ....	43,248,828	44,487,481	37,526,194	30,204,788	27,004,528	23,874,562	17,158,069
Other districts. ....	149,584	167,691	73,842	358,270	18,724	66,010	
West Kootenay—							
Ainsworth. ....	1,002,114	3,173,353	3,654,775	4,790,216	10,298,343	2,558,353	289,009
Nelson. ....	1,363,388	1,034,553	1,582,113	345,424	1,097,069	1,245,844	1,928,936
Slocan. ....	5,399,330	2,975,674	4,305,826	6,572,268	4,976,199	6,406,358	6,705,571
Other districts. ....	339,883	469,000	570,534	903,552	979,916	470,241	522,615
Yale. ....	67,076	100,465	25,419	21,215	21,567	35,584	29,719
	56,580,703	52,408,217	47,738,703	43,195,733	44,396,346	34,658,746	26,872,397

\* From the Report of the Minister of Mines, B. C.

The falling off in the output of this Province is the result of a number of causes.

The Slocan forest fires of 1910 by their interruption of traffic caused a cessation or decrease of shipments from several important properties. Then, too, the heavy decrease caused by the working out of the St. Eugene has not been entirely counteracted by the tonnage from the Sullivan. There are, however, several features of promise: the approaching completion of the Bear Lake Branch of the Canadian Pacific railway and its extension to Kaslo; the increased activity in the Slocan among the larger properties and the reopening of many of the older mines; the activity of the Consolidated Mining and Smelting Co. in Ainsworth and Sheep Creek camps, and the renewal of work at the Blue Bell mine, all pointing to increase in the lead production in the near future.

## NICKEL.

The mining and metallurgical treatment of the nickel-copper ores of the Sudbury district of Ontario has become one of the most important of Canada's metal mining industries, and special interest is attached to this industry because of the fact that these deposits at the present time supply a very large portion of the world's demand for nickel, and also because the present known available supplies of ore in the district appear to be sufficient for many years' operations. Additional interest is now lent to these ores by the discovery of the valuable properties possessed by the new alloy of nickel and copper recently introduced to commerce under the name of monel metal, of which some particulars were given in the report for 1908.

These nickel-copper ore deposits have already been the subject of special reports<sup>1</sup> by the Geological Survey at Ottawa, and the Ontario Bureau of Mines at Toronto, to which reference may be made for comprehensive descriptions of the geology of the district.

The production of ore and its reduction to a bessemer matte, was carried on during 1911 to a less extent than in the previous year. There were mined during the year 612,511 tons of ore, much of which is subjected to open air heap roasting before being smelted. There were smelted 610,834 tons, from which were produced 32,607 tons of Bessemer matte, carrying approximately 17,049 tons of nickel and 8,966 tons of copper. The net value of the matte was returned as \$4,945,592. The matte, which is shipped to the United States and Great Britain for refining, carries from 77 to 82 per cent of the combined metals, having averaged for the past year 52.3 per cent of nickel and 27.5 per cent in copper.

For the production of monel metal a special matte is produced with contents of 22 per cent copper and 58 per cent nickel, which is included in the total given above. Monel metal is produced from this special matte without the intermediate refining of either the nickel or copper.

Compared with 1910, there was a decrease in matte production, in 1911, of 2,426, or 6.9 per cent, and the decrease in total nickel content of matte was 1,587 tons, or 8.5 per cent. The total copper content of the matte was 8,966 tons, a decrease of 664 tons, or 6.9 per cent from the previous year.

The following were the aggregate results of the operations on the nickel-copper deposits of Ontario during the past four years:—

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<sup>1</sup> No. 873. Report on nickel and copper deposits of Sudbury, Ont., by A. E. Barlow, Geological Survey, Canada, 1901.

The Sudbury Nickel Region, by A. P. Coleman, Bureau of Mines, Vol. XIV, part III, 1904.

	1908.	1909.	1910.	1911.
	Tons of 2,000 lbs.	Tons of 2,000 lbs.	Tons of 2,000 lbs.	Tons of 2,000 lbs.
Ore mined.....	409,551	451,892	652,392	612,511
Ore smelted.....	360,180	462,336	628,947	610,834
Bessemer matte produced.....	21,197	25,845	35,033	32,607
Copper content of matte shipped.....	7,503	7,873	9,630	8,966
Nickel " ".....	9,572	13,141	18,636	17,049
Spot value of matte shipped.....	\$2,930,989	\$3,913,017	\$5,380,064	\$4,945,592
Wages paid.....	1,286,265	1,234,904	1,698,152	1,830,526
Men employed.....	1,690	1,573	1,882	1,885

According to Customs returns exports of nickel in matte, etc., were for twelve months ending December 31, as follows:—

	1907.	1908.	1909.	1910.	1911.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
To Great Britain.....	2,518,338	2,554,486	3,843,763	5,335,331	5,023,393
To United States.....	16,857,997	16,865,407	21,772,635	30,679,451	27,596,578
	19,376,335	19,419,893	25,616,398	36,014,782	32,619,971

The above figures of production do not include the nickel content of the silver-cobalt ores from the Cobalt district, of which it is difficult to obtain complete statistics. The shippers of silver-cobalt ores receive no return for the nickel content, although this metal forms an important constituent of the ore and is possibly, to some extent, saved by the refiners. Plants have been established by the Coniagas Reduction Company at Thorold, and the Deloro Mining and Reduction Company at Deloro, for the recovery of nickel and cobalt oxides.

During 1911, there were shipped from the cobalt-silver smelting works of Ontario, 154,174 pounds of cobalt oxide and nickel oxide, and 1,260,832 pounds of mixed cobalt and nickel oxides and cobalt material having a total value of \$221,690.

*Bounty on Refined Nickel and Nickel Oxide.*—Under the terms of "The Metal Refining Bounty Act," 1907<sup>1</sup> of the Province of Ontario (7 Edward VII, Chap. XIV), a bounty is authorized to be paid on nickel-cobalt, copper, and arsenic under certain conditions and restrictions during a period of five years following the passing of the Act (April, 1907).

The sections affecting nickel are as follows:—

"The treasurer of the province may, under the authority of such regulations as may from time to time be made in that behalf by the Lieutenant-

<sup>1</sup> The full text of the Act and Amendment will be found in the chapter on Cobalt.

Governor in Council, pay in each year to the refiners of the metals or metal compounds hereinafter specified, when refined in the province from ores raised and mined in the province, a bounty upon each pound of such metal or compound so refined as follows:—

“Class 1.—On refined metallic nickel or on refined oxide of nickel, 6 cents per pound on the free metallic nickel or on the nickel contained in the nickel oxide; but nickel upon which a bounty has already been paid in one form of product shall not be entitled to any further bounty in any other form; and the amount to be paid as bounty on the nickel products herein mentioned is not to exceed in all \$60,000 in any one year.”

In March 1912, the Act was amended to cover a further period of five years.

The price of refined nickel in New York during 1911 was quoted at from 40 to 45 cents per pound. The quotations at the end of December being “large lots contract basis 40 to 45 cents a lb. Retail spot from 50 cents for 500 lb. lots up to 55 cents for 200 lb. lots. The price of electrolytic is 5 cents higher.” During 1910 the price of refined nickel was quoted in New York at from 40 to 45 cents per pound according to size and terms of order.

Statistics of the quantities of nickel contained in matte produced are shown in the following table, the values being based on the final value of the metal, either as refined or monel metal.

Statistics of the quantities of ore mined and smelted, matte produced, etc., will be found in the chapter on smelter production.

NICKEL.—TABLE 1.  
Annual Production.

Calendar Year.	Pounds of nickel in matte shipped.	Average price per lb.	Value.	Calendar Year.	Pounds of nickel in matte shipped.	Average price per lb.	Value.
		Cts.	\$			Cts.	\$
1889.....	*830,477	60	498,286	1901.....	9,189,047	50	4,594,523
1890.....	1,435,742	65	933,232	1902.....	10,693,410	47	5,025,903
1891.....	4,035,347	60	2,421,208	1903.....	12,505,510	40	5,002,204
1892.....	2,413,717	58	1,399,956	1904.....	10,547,883	40	4,219,153
1893.....	3,982,982	52	2,071,151	1905.....	18,876,315	40	7,550,526
1894.....	4,907,430	38½	1,870,958	1906.....	21,490,955	42	8,948,834
1895.....	3,888,525	35	1,360,984	1907.....	21,189,793	45	9,535,407
1896.....	3,397,113	35	1,188,990	1908.....	19,143,111	43	8,231,538
1897.....	3,997,647	35	1,399,176	1909.....	26,282,991	36	9,461,877
1898.....	5,517,690	33	1,820,838	1910.....	37,271,033	30	11,181,310
1899.....	5,744,000	36	2,067,840	1911.....	34,098,744	30	10,229,623
1900.....	7,080,227	47	3,327,707				

\* Calculated from shipments made by rail.



The companies engaged in mining and smelting nickel ores are:—

The Canadian Copper Company (The International Nickel Company) of Copper Cliff, Ont., and New York.

The Mond Nickel Company, Victoria Mines, Ont., and London, England.

Reference has already been made to the occurrence of nickel as one of the minor constituents of the silver ores of the Cobalt district. The quantity of nickel contained in the ores shipped from this district has been estimated by the Ontario Bureau of Mines as follows:—

Year.	Ore shipped. Nickel content	
	Tons.	Tons.
1904.....	158	14
1905.....	2,144	75
1906.....	5,335	160
1907.....	14,788	370
1908.....	25,624	612
1909.....	30,677	766
1910.....	34,282	604
1911.....	26,653	392

A large portion of these ores, particularly the high grade, is now being reduced at Copper Cliff, Thorold, and Deloro, and as already mentioned cobalt and nickel oxides are being recovered in addition to silver bullion and white arsenic.

Statistics of the exports of nickel as compiled from the Customs Department's reports are shown in Table 2, and the imports in Table 3.

NICKEL.—TABLE 2.

Exports of Nickel contained in Ore, Matte, or other Product.

Calendar Year.	Value.	Calendar Year.	Lbs.	Value.
	\$			\$
1890.....	89,568	1903.....	12,699,227	1,116,099
1891.....	667,280	1904.....	11,233,869	1,091,349
1892.....	293,149	1905.....	17,318,059	1,569,693
1893.....	629,692	1906.....	20,653,845	2,042,965
1894.....	559,356	1907.....	19,276,335	2,280,374
1895.....	521,753	1908.....	19,419,893	1,866,624
1896.....	658,213	1909.....	25,616,398	2,676,483
1897.....	723,130	1910.....	36,014,782	4,030,040
1898.....	1,019,363	1911.....	32,619,971	,676 396
1899.....	939,915			
1900.....	1,031,030			
1901.....	751,080			
1902.....	1,007,211			

## NICKEL.—TABLE 3.

## Imports of Nickel and Nickel Anodes.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1890.....	3,154	1898.....	5,882	1906.....	15,976
1891.....	3,889	1899.....	9,449	1907.....	19,511
1892.....	3,208	1900.....	6,988	1908.....	36,870
1893.....	2,905	1901.....	12,029	1909.....	14,930
1894.....	3,528	1902.....	15,448	1910.....	23,266
1895.....	4,267	1903.....	26,177	1911.....	22,693
1896.....	4,787	1904.....	14,682		
1897.....	4,737	1905.....	19,076		

During the calendar year 1911 there was an import of "nickel, nickel-silver, and German silver in ingots or blocks" to the extent of 124,710 pounds, valued at \$30,736, and "nickel in bars and rods" 490,774 pounds, valued at \$116,579.

The only other important producer of nickel ore outside of Canada is the French colony of New Caledonia. The exports of nickel ore from this source since 1898 have been as follows in metric tons:—

Exports of Nickel Ore from New Caledonia.<sup>1</sup>

Year.	Metric tons.	Year.	Metric tons.	Year.	Metric tons.
1898.....	53,200	1903.....	77,360	1908.....	108,000
1899.....	103,908	1904.....	98,655	1909.....	86,000
1900.....	100,319	1905.....	125,289	1910.....	99,000
1901.....	133,814	1906.....	118,890		
1902.....	129,653	1907.....	120,103		

<sup>1</sup> Statistique de l'Industrie Minérale en France et en Algérie, Paris.

The nickel ore of New Caledonia carries about 6½ per cent of nickel.

Practically all of the above ore is smelted in France, Germany, and England.

The production of raw nickel at smelting works (partly estimated), is given by the 'Metallgesellschaft' as follows, in metric tons:—

### Production of Raw Nickel at Smelting Works, in Metric Tons.

Producing country.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.
United States of North America and Canada. . . .	5,100	6,000	4,500	6,500	6,500	7,000	9,000	10,000	12,000
England . . . . .	1,700	2,200	3,100	3,200	3,200	3,000	3,200	3,500	4,500
Germany <sup>1</sup> . . . . .	1,600	2,000	2,700	2,800	2,600	3,000	3,500	4,500	5,000
France . . . . .	1,500	1,800	2,200	1,800	1,800	1,400	1,200	1,500	2,000
Other countries. . . . .						200	400	600	1,000
Total production <sup>2</sup> . . . . .	9,900	12,000	12,500	14,300	14,100	14,600	17,300	20,100	24,500

<sup>1</sup> The figures of production stated for Germany only cover the output in the Kingdom of Prussia ; nickel is also produced in the Kingdom of Saxony, but no data are obtainable of this production, which is, however, not important.

<sup>2</sup> The entire production of nickel, apart from quite insignificant quantities obtained in Germany, Norway, and the United States of America, comes from New Caledonian and Canadian ores.

Statistics of the average yearly prices of nickel in Europe are also given by the same authority as follows:—

### Yearly Average Prices of Nickel in Europe in Cents per Pound, and Marks per Kilogram.

Year.	Prices in marks per kilo.	Cents per lb.	Year.	Prices in marks per kilo.	Cents per lb.
1889. . . . .	4·50	48·6	1901. . . . .	3·00	32·4
1890. . . . .	4·50	48·6	1902. . . . .	3·20	34·6
1891. . . . .	4·50	48·6	1903. . . . .	3·30	35·6
1892. . . . .	4·50	48·6	1904. . . . .	3·30	35·6
1893. . . . .	3·80	41·0	1905. . . . .	3·30	35·6
1894. . . . .	3·60	38·9	1906. . . . .	3·80	41·0
1895. . . . .	2·60	28·1	1907. . . . .	3·50	37·8
1896. . . . .	2·50	27·0	1908. . . . .	3·25	35·2
1897. . . . .	2·50	27·0	1909. . . . .	3·25	35·2
1898. . . . .	2·50	27·0	1910. . . . .	3·25	35·2
1899. . . . .	2·50	27·0	1911. . . . .	3·25	35·2
1900. . . . .	3·00	32·4			

Mark=23·8 cents.      Kilogram=2·20462 bs.

## SILVER.

Owing to the rapid development of the Cobalt silver camp in Ontario during the past five years, the production of silver in Canada has, in point of value, taken second place in the list of our mineral productions, being exceeded only by coal.

The total production of silver in 1911, including that produced as bullion and the metal estimated as recovered from ores sent to smelters or otherwise treated, was reported as 32,559,044 fine ounces, which, compared with a production of 32,869,264 ounces in 1910, shows a decrease of 0.94 per cent.

The average value of fine silver in 1911, according to New York quotations, was 53.304 cents per ounce, as compared with an average value of 53.486 cents in 1910, a decrease of about 0.34 per cent.

The total value of the silver production in 1911 was \$17,355,272, a decrease of \$225,183, or 1.28 per cent over the value, \$17,580,455, in 1910.

A comparison of the production of 1910 and 1909, shows an increase for 1910 of 5,339,791 ounces, or 19.4 per cent in quantity, and \$3,401,951, or 24 per cent in value, the average price in 1910 having increased about 3.85 per cent from 1909.

Statistics of the annual production of silver since 1887 are shown in Table 1.

SILVER.—TABLE 1.

**Annual Production, 1887-1911.**

Year.	Ozs.	Value.	Average price. per oz.	Year.	Ozs.	Value.	Average price. per oz.
		\$	Cts.			\$	Cts.
1887 .....	355,083	347,271	98·00	1900 ..	4,468,225	2,740,362	61·33
1888 .....	437,232	410,998	94·00	1901 .....	5,539,192	3,265,354	58·95
1889 .....	383,318	358,785	93·60	1902 .....	4,291,317	2,238,351	52·16
1890 .....	400,687	419,118	104·60	1903 .....	3,198,581	1,709,642	53·45
1891 .....	414,523	409,549	98·00	1904 .....	3,577,526	2,047,095	57·22
1892 .....	310,651	272,130	86·00	1905 .....	6,000,023	3,621,133	60·35
1893 .....		330,128	77·00	1906 .....	8,473,379	5,659,455	66·79
1894 .....	847,697	534,049	63·00	1907 .....	12,779,799	8,348,659	65·33
1895 .....	1,578,275	1,030,299	65·28	1908 .....	22,106,233	11,686,239	52·86
1896 .....	3,205,343	2,149,503	67·06	1909 .....	27,529,473	14,178,504	51·50
1897 .....	5,558,456	3,323,395	59·79	1910 .....	32,869,264	17,580,455	53·49
1898 .....	4,452,333	2,593,929	58·26	1911 ..	32,559,044	17,355,272	53·30
1899 ..	3,411,644	2,032,658	59·58				

From 1887 to 1893, the production ranged in value between \$300,000 and \$400,000, and was derived chiefly from the Provinces of Ontario and Quebec. The next three years saw a rapid increase in the production due to the development of the silver-lead ore deposits in British Columbia, and in 1896 a production of over \$2,000,000 is recorded. From that year until 1905 the production

varied from \$2,000,000 to \$3,500,000, rising rapidly during the next six years to \$17,355,272 in 1911, as a result of the discovery of the rich ores of the Cobalt district. Ontario, in 1905, produced 40.9 per cent of the total output. In 1911 the production obtained from Ontario was 93.8 per cent, and was practically all from the Cobalt district, the contribution of British Columbia being almost 5.8 per cent.

Statistics of the annual production in each province are separately shown in Table 2.

## SILVER.—TABLE 2.

## Production by Provinces, 1887-1911.

Calendar Year.	ONTARIO.		QUEBEC.		BRITISH COLUMBIA.		YUKON TERRITORY.	
	Ozs.	Value.	Ozs.	Value.	Ozs.	Value.	Ozs.	Value.
		\$		\$		\$		\$
1887.....	190,495	186,304	146,898	143,666	17,690	17,301		
1888.....	208,064	195,580	149,388	140,425	79,780	74,993		
1889.....	181,609	169,986	148,517	139,012	53,192	49,787		
1890.....	158,715	166,016	171,545	179,436	70,427	73,666		
1891.....	225,633	222,926	185,584	183,357	3,306	3,266		
1892.....	41,581	36,425	191,910	168,113	77,160	67,592		
1893.....		8,689		126,439		195,000		
1894.....			101,318	63,830	746,379	470,219		
1895.....			81,753	53,369	1,496,522	976,930		
1896.....			70,000	46,942	3,135,343	2,102,561		
1897.....	5,000	2,990	80,475	48,116	5,472,971	3,272,289		
1898.....	85,000	49,521	74,932	43,655	4,292,401	2,500,753		
1899.....	202,000	120,352	40,231	23,970	2,939,413	1,751,302	236,000	137,034
1900.....	161,650	99,140	58,400	35,817	3,958,175	2,427,548	290,000	177,857
1901.....	151,400	89,250	41,459	24,440	3,151,333	3,036,711	195,000	114,953
1902.....	145,000	75,632	42,500	22,168	3,917,917	2,043,586	185,900	96,985
1903.....	17,777	9,562	28,600	15,287	2,996,204	1,601,471	156,000	83,362
1904.....	206,875	118,376	15,000	8,583	3,222,481	1,843,935	133,170	76,201
1905.....	2,451,356	1,479,442	19,620	11,841	3,439,417	2,075,757	89,630	54,093
1906.....	5,401,766	3,607,894	17,686	11,813	2,990,262	1,997,226	63,665	42,522
1907.....	9,982,363	6,521,178	16,000	10,452	2,745,448	1,793,519	35,988	23,510
1908.....	19,398,545	10,254,847	13,299	7,030	2,631,389	1,391,058	63,000	33,304
1909.....	24,822,099	12,784,126	13,233	6,815	2,649,141	1,364,387	45,000	23,176
1910.....	30,366,366	16,241,755	7,593	4,061	2,407,887	1,287,883	87,418	46,756
1911.....	30,540,754	16,279,443	18,435	9,827	1,887,147	1,005,924	112,708	60,078

The average price of fine silver in New York during 1911 varied between a maximum of 55.7 cents per ounce in November, and a minimum of 52.1 cents per ounce in August, the average being 53.304 cents per ounce.

In London the average price of silver in 1911 was 24.592 pence per standard ounce of a fineness of 0.925. For the year 1910, the average price per fine ounce in New York was 53.486 cents, the highest being 55.6 cents in November, and the lowest 51.4 in March of that year.

The average monthly prices of silver in New York from 1906 to 1911, and in London during 1911, are shown in tabulated form following.



## Average Monthly Prices of Silver.

Months.	New York.—Cents per fine ounce.					London.— Pence per Standard ounce (a).
	1907.	1908.	1909.	1910.	1911.	1911.
January.....	68·673	55·678	51·750	52·375	53·795	24·865
February.....	68·835	56·000	51·472	51·534	52·222	24·081
March.....	67·519	55·365	50·468	51·454	52·745	24·324
April.....	65·462	54·505	51·428	53·221	53·325	24·595
May.....	65·981	52·795	52·305	53·870	53·308	24·583
June.....	67·990	53·663	52·538	53·462	53·043	24·486
July.....	68·144	53·115	51·043	54·150	52·630	24·286
August.....	68·745	51·683	51·125	52·912	52·171	24·082
September.....	67·792	51·720	51·449	53·295	52·440	24·209
October.....	62·435	51·431	50·923	55·490	53·340	24·594
November.....	58·677	49·647	50·703	55·635	55·719	25·649
December.....	54·565	48·769	52·226	54·428	54·905	25·349
Average for the year.....	65·327	52·864	51·503	53·486	53·304	24·592

(a) 925 parts fine.

Important quantities of silver are now being produced in Canada, both as fine metal and as silver bullion, ranging in fineness from 850 to 998·2. Fine silver is produced at Trail, B.C., by the Consolidated Mining and Smelting Company of Canada, Limited, chiefly from the silver-lead ores of that Province, and is shipped to China, the United States, and to the Ottawa mint.

The annual production of fine silver at Trail since 1904 has been as follows:—

Year.	Fine ozs.	Year.	Fine ozs.
1904.....	551,450	1909.....	2,003,003
1905.....	1,088,328	1910.....	1,798,960
1906.....	1,263,809	1911.....	1,325,601
1907.....	1,631,422		
1908.....	1,956,039	Total.....	11,618,612

In Ontario ores from the Cobalt district are treated by the following companies:—

The Canadian Copper Company at Copper Cliff, Ont.

The Deloro Mining and Reduction Company, Deloro, Ont.

The Coniagas Reduction Company, St. Catharines, Ont.

Canada Refining and Smelting Company, Orillia, Ont.

Silver bullion of a fineness varying from 850 to 998·2 is produced at the works, other products being white arsenic and more recently nickel and cobalt oxides or mixed oxides. The silver bullion, as a rule, finds a market in the

United States and in England. The bullion shipped in 1907 contained 4,449,722 fine ounces of silver; in 1908, 11,168,689 ounces; in 1909, 14,385,985 ounces; and in 1910, 17,365,165 fine ounces. In 1911 these smelters produced 17,753,167 fine ounces, or 53.9 per cent of the total production of Ontario.

### Quebec.

The small quantity of silver credited to the Province of Quebec for a number of years, represents a small silver content of the pyritic ores mined at Capelton and Eustis in the Eastern Townships.

### Ontario.

From a production valued at only \$118,376 in 1904, the silver output of the Province has grown to a value of over \$16,200,000 in 1911. Not only does it contribute almost 94 per cent of the total silver production of Canada, but it now forms a very appreciable part (estimated at over 13 per cent), of the world's production. According to returns received by this department, there were shipped during 1911, 15,417 tons of ore, and 9,329 tons of concentrates, or a total tonnage of 24,746 tons, having a value of \$14,271,964, besides silver bullion produced at the mines, carrying 3,766,022 fine ounces of silver.

The silver content of ore shipped was estimated as 20,065,621 ounces, or an average of 1,302 ounces per ton, and of the concentrates shipped 8,118,231 ounces, or an average of 870 ounces per ton; the total silver content of ore, concentrates, and bullion shipped from the mines being 32,949,874 ounces. The mine owners receive payment for only 93 to 98 per cent of the silver content, and in estimating and valuing the production a deduction of five per cent is made from silver contained in ore and concentrates to cover losses in smelting and refining. On this basis the silver recovery is estimated at 30,540,754 ounces, and valued at \$16,279,443. No payments for cobalt content were reported.

In the following table a record of shipments since 1904 is given, the figures for the first three years being those published by the Ontario Bureau of Mines.

**Silver Ore and Bullion Shipments from Cobalt Mines, 1904-1911.**

Year.	SHIPMENTS.		SILVER CONTENT.		SILVER IN OUNCES, PER TON.		Silver bullion shipments. Fine ounces.	Total value of silver.
	Ore.	Con-	Ore.	Concen-	Ore.	Con-		
	Tons.	centrate. Tons.	Ozs.	trate. Ozs.	Ore.	Concentrate.		
								\$
1904. ....	158	.....	206,875	.....	1,309	.....	.....	118,376
1905. ....	2,144	.....	2,451,356	.....	1,143	.....	.....	1,473,192
1906. ....	5,335	.....	5,401,766	.....	1,013	.....	.....	3,607,894
1907. ....	14,644	.....	9,982,363	.....	682	.....	.....	6,521,178
1908. ....	25,682	*	19,398,545	*	755	*	.....	10,254,847
1909. ....	27,835	3,059	22,349,717	3,627,819	803	1,186	143,440	12,784,126
1910. ....	28,684	6,943	23,797,111	7,111,579	830	1,024	1,003,111	16,241,755
1911. ....	15,417	9,329	20,065,621	8,118,231	1,300	870	3,766,022	16,279,443

\* Included with ore.

As the camp has developed, the average grade of the ore shipped has gradually diminished, although the introduction of concentration plants in 1908, and their increased use has tended to keep the ore shipped up to a high standard.

With respect to the nickel-cobalt and arsenic contents of these ores, the mining companies have been paid for only a small portion of the cobalt content, and nothing for the nickel and arsenic; in fact in certain cases the last two are penalized, and in 1911 payment for even cobalt ceased.

The total metal content of these ores, as estimated by the Ontario Bureau of Mines, is shown in the next table. The figures for ore shipments and silver content, while not identical, agree very closely with those given in the previous table.

**Total Production Cobalt Mines, 1904-1911.\***

Year.	ORE AND CONCENTRATE SHIPPED.	METALLIC CONTENT.			
		Nickel.	Cobalt.	Arsenic.	Silver.
	Tons.	Tons.	Tons.	Tons.	Ozs.
1904.....	158	14	16	72	206,875
1905.....	2,144	75	118	549	2,451,356
1906.....	5,335	160	321	1,440	5,401,766
1907.....	14,788	370	739	2,958	10,023,311
1908.....	25,624	612	1,224	3,672	19,437,875
1909.....	30,677	766	1,533	4,294	25,897,825
1910.....	34,282	604	1,098	4,897	†30,645,181
1911.....	26,653	392	852	3,806	31,507,791

\* As per Ontario Bureau of Mines.

† Bullion shipments from mines included.

Nearly 30 per cent of the ore shipped from Cobalt was treated in metallurgical works in Canada, and white arsenic is being produced therefrom, of which record will be found under smelter production.

While the greater number of the operating companies hold unrestricted titles to their properties, several are operated on a royalty basis on mining lands owned and leased by the Timiskaming and Northern Ontario Railway Commission. Mr. Arthur A. Cole, Mining Engineer to the Commission, has in his annual report compiled some very interesting statistics covering the whole district with respect to ore shipments, concentration, power and labour, prices paid for ore, etc., from which the following tables and extracts have been freely drawn:—

## Ore Shipments from the Cobalt District for the Years 1904 to 1911.

Mine.	1904. to 1906.	1907.	1908.	1909.	1910.	1911.	Totals. 1904-1911.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Badger.....						27·10	27·10
Bailey.....	30·00		88·80	36·85		20·00	175·65
Beaver.....				51·38	140·06	790·81	982·25
Buffalo.....	1,193·60	1,241·54	536·90	648·86	1,185·77	1,275·19	6,081·86
Casey-Cobalt.....			10·00	8·50	48·40	277·74	344·64
Chambers-Ferland.....			223·89	517·88	885·92	622·85	2,250·54
City of Cobalt.....		50·61	761·04	566·82	329·40	281·30	1,989·17
Cobalt Central.....		77·33	187·99	339·01	285·62	22·40	912·35
Cobalt Lake.....			225·97	95·47	296·80	2,111·32	2,729·56
Cobalt Townsite.....		143·22	177·71	27·35	310·99	703·51	1,362·78
Colonial.....	15·00	40·38			178·60	114·10	348·08
Coniagas.....	452·62	2,447·37	610·25	806·93	1,261·46	1,813·89	7,392·52
Crown Reserve.....			657·35	3,167·52	2,814·25	977·32	7,616·44
Drummond.....	307·35	104·13	1,161·38	1,225·47	2,194·41	714·83	5,707·57
Foster.....	200·85	312·13	191·20	113·90			818·07
Green Meehan.....	37·03	98·39				102·98	238·40
Hargrave.....	28·45				343·68	102·44	474·57
Hudson Bay.....		149·53	1,094·23	743·64	260·33	898·88	3,146·61
Imperial Cobalt.....		14·61					14·61
Kerr Lake.....	213·33	319·76	660·24	1,173·42	5,088·78	1,292·58	8,748·08
King Edward (Watts).....	19·00	31·12	338·19	146·58	134·12	20·00	689·01
LaRose.....	1,522·52	2,815·45	4,843·17	6,757·21	5,131·53	3,581·54	24,651·42
†Lawson.....	14·61	61·12					75·73
McKinley-Darragh.....	547·54	742·42	1,808·39	1,056·49	2,393·39	3,238·64	9,786·87
Nancy Helen.....		30·10		116·32			347·74
Nipissing.....	2,668·10	2,538·26	3,571·96	6,470·52	6,833·81	2,952·20	25,034·85
Nova Scotia.....	43·95	272·21	237·95	224·79			778·90
North Cobalt.....				6·87		3·00	9·87
O'Brien.....	140·50	1,491·61	3,459·51	1,419·11	608·57	628·44	7,747·74
Peterson Lake Leases (Little Nipissing).....			40·67	39·62	313·76	28·45	422·50
(Nova Scotia).....				121·15			121·15
Provincial.....			75·84		52·05	100·54	228·43
†Princess.....		3·93					3·93
Red Rock.....		45·71					45·71
Right of Way.....	46·25	129·37	750·04	1,608·99	981·41	666·06	4,182·12
Rochester.....					28·30		28·30
Silver Bar.....			0·58			2·72	3·30
Silver Cliff.....			160·44	149·06	156·84	92·30	558·64
Silver Leaf.....	9·00	46·36	197·03				252·39
Silver Queen.....	175·57	478·57	885·70	316·64			1,856·58
Timiskaming.....		204·32	795·20	852·14	1,119·12	855·60	3,826·38
Timiskaming-Cobalt.....	20·47	67·98					88·45
Trethewey.....	438·06	833·58	1,408·69	1,134·50	536·64	602·98	4,954·45
†University.....	171·28	60·23					231·51
Victoria.....			0·47				0·47
Violet.....	36·00						36·00
Waldman.....					38·81		38·81
Wyandoh.....					24·15		24·15
Total.....	8,331·08	14,851·34	25,362·10	29,942·99	33,975·97	24,921·71	137,386·26

† The shipment in 1905 was made by the White Silver Mining Co., the former owner of the Hargrave property.

‡ Shipments from Lawson, Princess, and University since 1907, included with LaRose.



Shipments from the Cobalt District for the Calendar Year 1911.

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Mine.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Total.
Badger.				27 10									27 10
Bailey.	93 21	182 87	21 87	20 00									20 00
Beaver.	121 83	122 77	127 10	91 60	60 73	31 25	31 50	247 08	30 38	59 38		32 54	790 81
Buffalo.				16 65	108 45	38 88	130 60	96 01	53 58	122 29	87 73	124 35	1,275 19
Cassey-Cobalt.	64 95	32 80	64 15	65 40	5 19				40 00		196 90		277 74
Chambers-Ferland.	30 00	31 90	89 05	66 45	32 80	64 40	64 70	64 00		32 00	32 00	75 00	622 85
City of Cobalt.		22 40				31 10							281 30
Cobalt Central.		345 45	189 20	181 50	98 00	265 25	89 96	154 73	214 46	230 20	162 51	180 06	2,111 32
Cobalt Lake.				14 40	35 25	23 50	48 65	70 64	133 07	110 55	23 58	121 54	703 51
Cobalt Townsite.	122 33			21 40		22 75		23 70		24 00	22 25		114 10
Colonial.				121 30	181 68	165 77	60 60	291 84	101 98	132 60	149 00	91 35	1,813 89
Cominas.	82 15	168 18	266 54	114 15	135 70	57 90	131 44	95 85	78 63	212 30	48 92	41 65	977 32
Crown Reerve.	78 67	86 41	77 40					138 70	183 83	42 90	90 00	90 00	714 83
Drummond.					29 00								102 98
Green Meekian.			20 55			60 00							102 44
Hargrave.		30 55	32 60	61 75	98 60	94 25	123 02	126 11	63 07	62 84	97 32	83 15	898 88
Hudson Bay.	30 62	150 78	60 05	120 75	90 55	90 05	30 90	149 00	90 74	93 80	111 47	31 79	1,292 58
Kear Lake.	212 70												20 00
King Edward.		20 00											
La Rose.	214 41	209 52	146 65	397 28	305 55	272 78	338 86	492 60	398 57	275 71	252 37	277 24	3,581 54
MacKinley-Darragh.	161 31	271 93	202 30	297 49	274 79	299 34	183 80	319 23	337 68	397 33	324 98		3,238 64
Nipissing.	440 82	219 73	186 15	178 51	194 35	370 38	283 95	184 45	206 32	128 78	358 02	260 74	2,952 20
North Cobalt.		3 00											3 00
O'Brien.	36 40	62 40	65 41	64 70	39 90	63 50	62 75	68 50	35 26	69 21	32 01	33 40	628 44
Peterson Lake.	28 45												28 45
Provincial.				20 00			30 35		25 14		25 05		100 54
Right of Way.	64 20	30 05	62 55		67 32	94 34	32 95	90 67	89 53	61 25	41 12	32 08	666 06
Silver Bar.					2 72								2 72
Silver Cliff.	24 25		25 55	42 10									92 30
Timiskaming.	31 65	67 43	110 21	32 54	96 02	42 77	90 26	70 26	51 86	101 84	67 78	92 98	855 60
Tretheway.	48 40	24 45	67 90	25 25	105 47	35 35	56 00	24 45	50 40	79 75	29 88	55 68	602 98
Total.	1,886 35	2,101 62	1,815 23	1,980 72	2,020 52	2,173 56	1,850 29	2,702 82	2,184 50	2,177 33	2,087 26	1,941 50	24,921 71



The ore produced in the years 1908 to 1911, was shipped to the following countries for treatment:—

Country.	1908.		1909.		1910.		1911.	
	Tons.	Per cent	Tons.	Per cent	Tons.	Per cent	Tons.	Per cent
Canada .....	7,401·14	29·18	10,230·64	34·47	9,922·40	29·20	8,746·21	34·02
Great Britain.....	222·08	0·88	30·25	0·10	393·73	1·15	.....	.....
Germany.....	299·46	1·18	106·51	0·35	232·14	0·69	218·66	0·85
United States.....	17,439·42	68·76	19,575·59	65·08	23,428·70	68·96	16,745·35	65·13
Total .....	25,362·10	100·00	29,942·99	100·00	33,976·97	100·00	25,710·22	100·00

With respect to concentration Mr. Cole reports: "Fifteen mills operated during the year, milling a total of 381,870 tons. The Hudson Bay mill started operations in March but the Silver Cliff, King Edward, and Cobalt Central mills were closed down most of the year. The King Edward mill has recently been rented by the City of Cobalt Mining Company for the treatment of their own ores.

"Mills are under construction for the Beaver and Nipissing Companies. Cyanidation is used in conjunction with regular water concentration in the O'Brien and Buffalo mills and in the case of the Nova Scotia it is a combination method of cyanidation and amalgamation. The latter combination is also to be adopted in the new Nipissing mill.

"The following is a list of the mills of the district showing their daily rated capacity:—

Mill.	District.	Capacity per day.	Remarks.
Buffalo .....	Cobalt.....	Tons. 150	Closed down.
Cobalt Central.....	" .....	100	
Cobalt Lake.....	" .....	70	
Colonial.....	" .....	30	
Coniagas.....	" .....	160	Operated by City of Cobalt mine.
Hudson Bay.....	" .....	50	
King Edward.....	" .....	30	
McKinley-Darragh.....	" .....	120	
Nipissing Reduction .....	" .....	75	Customs Mill.
Northern Customs .....	" .....	200	" "
Nova Scotia .....	" .....	160	" "
O'Brien.....	" .....	90	Closed down.
Silver Cliff.....	" .....	80	
Timiskaming.....	" .....	80	
Trethewey.....	" .....	100	
Millerett.....	Gowganda.....	30	Closed down.
Reeve Dobie.....	" .....	30	
<i>Under Construction.</i>		1,555	
Beaver.....	Cobalt.....	60	
Nipissing.....	" .....	200	
		1,815	

"Following are tables of concentration which illustrate the advance made in this part of the industry during 1911.

Mills and mines.	Tons milled.	CONCENTRATES.			Concentration ratio.
		Jigs.	Tables.	Total.	
Buffalo*.....	43,930·00	236·00	735·00	971·00	45-1
Cobalt Central.....	1,478·40	3·82	12·37	16·19	91-1
Colonial.....	7,755·00			127·00	61-1
Cobalt Lake.....	3,800·00	39·15	55·15	94·30	40-1
Coniagas.....	53,150·00	318·70	952·40	1,271·10	42-1
Hudson Bay.....	18,294·00	239·00	427·00	666·00	27-1
King Edward—					
City of Cobalt.....	1,047·50	3·00	25·00	28·00	38-1
King Edward.....	12,019·00			16·50	73-1
McKinley-Darragh.....	46,497·00	644·00	1,884·00	2,528·00	18-1
Millerett.....	5,454·00	8·00	82·00	90·00	61-1
Nipissing Reduction.....	14,766·53	87·82	150·73	238·55	62-1
Northern Customs—					
City of Cobalt.....	5,911·08			233·07	25-1
Cobalt Townsite.....	12,569·97		388·39	388·39	33-1
Casey Cobalt.....	362·00			12·00	33-1
La Rose.....	36,264·49		1,721·10	1,721·10	21-1
Nancy Helen.....	519·00		4·80	4·80	108-1
Timiskaming.....	34,720·00	177·44	588·23	765·67	45-1
Trethewey.....	30,925·00	107·68	341·12	448·80	69-1
Total .....	329,462·97			9,620·47	34-1

\* The mill cyanided 8,804 tons slimes producing 4,565 lbs. of bullion.

Nova Scotia.....	19,152 tons milled, produced	686,406 ozs. bullion.
O'Brien .....	33,256	273,930

Total tons milled by water concentrating mills.....	52,408	960,336	329,462·97
"          cyanide mills.....			52,408·00

Total tons milled.....	381,870·97
------------------------	------------

"From small beginnings and a comparatively insignificant position in the early history of Cobalt, concentration has developed till it is at present one of the dominating features of the situation. In fact, it is hardly too much to say that half the mines now shipping would be closed down if they had to depend on their high grade ore without their mills for their profits."

### Sampling.

"The ore sampling works of Campbell and Deyell were in continuous operation throughout 1911 and during that time treated 5,653 tons of high grade ore. This represents about 70% of the capacity of the plant. The plant was designed to sample the high grade silver ores of the Cobalt district and details have been worked out with the greatest care. Machines are being installed which cut out the objectionable feature of floor sampling so that now the plant is practically automatic throughout. The work performed in this plant is equal to the best on the continent and having it located in Cobalt is a decided boon to the camp."

## Power.

"The spring break up of 1911 was late in arriving and was not preceded by any considerable temporary thaws.

"So pronounced was the shortage of water that the production of power was materially affected.

"This noticeably cut down the volume of ore shipment during the first three months of the year.

"Towards the end of the year a consolidation took place of the two Montreal River Power Companies, viz.: The Cobalt Power Company and The Cobalt Hydraulic Power Company, under the name of the Northern Ontario Light and Power Company, Limited."

## Smelting of Cobalt Ores.

"The following is a list of the smelting companies that received ore from the Cobalt district during 1911 accompanied by some of the schedules on which the purchases were made. As far as possible the tariffs given are those that were in force on January 1, 1912.

"The following is the list:—

Canadian Copper Company, Copper Cliff, Ont.

Canada Refining and Smelting Company, Orillia, Ont.

Coniagas Reduction Company, St. Catharines, Ont.

Deloro Mining and Reduction Company, Deloro, Ont.

American Smelting and Refining Company, New York, N.Y., U.S.A.

Balbach Smelting and Refining Company, Newark, N.J., U.S.A.

Beer, Sondheimer and Company, Frankfort-on-Main, Germany, and  
New York, N.Y., U.S.A.

Pennsylvania Smelting Company, Pittsburg, Pa., U.S.A.

Government of Saxony, Saxony, Germany.

United States Metals Refining Company, New York, N.Y., U.S.A.

### *1. Canadian Copper Company, Copper Cliff, Ont.*

"Recent changes have increased the capacity of the plant from 800 to 1,000 tons per month, giving a monthly output of silver of from 1,000,000 to 1,500,000 ounces. Another result of the enlargement and the changes that have been made is the quicker returns to shippers. Formerly the Company paid for 70 per cent of the silver in 35 days, and 30 per cent in 90 days from sampling date. Since December 1, 1910, payments are made 70 per cent in 30 days and 30 per cent in 60 days.

All purchases are made by the Orford Copper Company of New York, and the following is the curtailed schedule for arsenical-cobalt-silver ores.

Purchaser to make payment for:—

84	per cent of silver per ton of ore (2,000 lbs.) when same assays	200- 500 ounces silver.
85	" " " "	500- 600 "
87	" " " "	600- 800 "
90	" " " "	800-1,000 "
92	" " " "	1,000-1,300 "
93	" " " "	1,300-1,600 "
93½	" " " "	1,600-2,000 "
94½	" " " "	2,000-2,500 "
95	" " " "	2,500-3,000 "
95½	" " " "	3,000-4,000 "
96	" " " "	4,000-5,000 "
96½	" " " "	5,000 and over "

Ore to be delivered to the Canadian Copper Company f.o.b. cars, Copper Cliff, Ont. Ore to be at shipper's risk until sampling is undertaken, as purchaser can assume no responsibility for the ore until same has been taken into its sampler.

Purchaser to sample at its expense, purchaser's and seller's representatives to be present. Assays to be made by Ledoux and Company of New York, at seller's expense, which assays are to govern in settlement.

Payment of 70 per cent of the silver returnable to the seller, as per the above scale, to be made at the New York official price for silver on the first settlement date, which shall be 30 days after the date on which sampling of the ore is completed, and the balance, 30 per cent, on the second settlement date, on the New York official price of silver on that day, which shall be 60 days after sampling of the ore is completed. The purchaser, however, reserves the right to deliver upon either or both of the settlement dates above specified, in lieu of cash, at his option, such silver bullion (commercial bar silver) as is due the seller in settlement upon these dates, such delivery to be made in New York city.

## 2. Coniagas Reduction Company, Limited, St. Catharines, Ont.

"The plant of the Coniagas Reduction Company treated about 6,000,000 ounces of silver during 1911, most of the resulting bullion being shipped to London, England.

The following is in condensed form the smelting schedule that went into effect on November 1, 1911.

Percentage of silver to be paid for on commercial assay of silver content per tons of 2,000 pounds as follows:—

55 per cent for	50 ounces and proportionate increase up to.
73	200 "
78	300 "
84	300 "
91.5	1,000 "
92.5	1,500 "
93.5	2,000 "
95	3,000 ounces and over.

Sampling to be at vendor's expense.

All ore purchased to be at a refining charge of  $\frac{3}{4}$  cent per ounce of silver content.

Seventy-five per cent of the amount 30 days after date of weighing and sampling report.



Twenty-five per cent of amount 90 days after date of said report. Price of silver to be determined by New York quotation, as given by Messrs. Handy and Harman to Western Union Telegraph Company on dates of settlement.

*3. Deloro Mining and Reduction Company, Limited, Deloro, Ont.*

"The smelting schedule of this Company published at the beginning of 1911 was still in force on the 1st of January, 1912, and is as follows:—

Treatment charge, \$25 per ton of ore.

Refining charge, three-quarters of a cent per ounce of silver contents on ore assaying 3,000 ounces and over per ton. One cent per ounce of silver contents on ore assaying 2,000 to 3,000 ounces per ton. One and a half cents per ounce of silver contents on ore assaying less than 2,000 ounces per ton.

Terms of payment, 75 per cent of net proceeds at Handy and Harman's New York quotation, 30 days after completion of sampling; 25 per cent of net proceeds at Handy and Harman's New York quotation, 90 days after completion of sampling. Ore to be delivered in carload lots f.o.b., Marmora station, C. O. railway, and to be at shipper's risk until sampling is undertaken.

*4. Canada Refining and Smelting Co., Limited, Orillia, Ont.*

"This Company blew in its furnace on February 20, 1911, but was closed down later on while the plant was being enlarged. Its present capacity is from 15 to 20 cars monthly or double what it was when operations started.

The smelting schedule remains unchanged and is as follows:—

84	per cent of silver contents by commercial assay	200	ozs. and over per ton,	2,000	lbs.
86	"	300	"	"	"
89	"	500	"	"	"
91	"	750	"	"	"
93	"	1,000	"	"	"
93½	"	1,500	"	"	"
94½	"	2,000	"	"	"
95	"	2,500	"	"	"

Ores containing less than 3,000 ounces per ton are subject to a refining charge of ½ cent per ounce, and ores containing less than 1,500 ounces per ton are subject to a refining charge of ¾ cent per ounce. Ores containing less than 1,000 ounces per ton are subject to a treatment charge of \$10 per ton in addition to above.

Terms of payment for silver, 75 per cent of amount 30 days after date of weighing and sampling report. 25 per cent of amount 90 days after date of said report.

Price of silver to be New York official quotation.

Ore to be delivered f.o.b., Orillia, carload lots at owner's risk.

Weights to be taken after milling and moisture determination.

When so desired, Campbell and Deyell's sampling and weights will be accepted as final, and in case of dispute on assays, settlement will be made on



assays of Campbell and Deyell as umpire, or such other umpire as may be mutually agreed upon by parties.

*5. American Smelting and Refining Company, New York, U.S.A.*

"Of the foreign companies receiving silver ores from Cobalt, the American Smelting and Refining Company received the largest tonnage. The ore was consigned to both Perth Amboy, N.J., and Denver, Colo., and consisted of both high and low grades.

The prices offered by this Company vary according to the grade and analysis of the different ores submitted and also as to whether or not occasional shipments are involved or time contracts for entire outputs. Prices are also contingent to some extent upon length of contract and upon operating conditions at the smelter at the time any definite tonnage is offered. An idea of the prices ruling may, however, be gathered from the following contract rates which are now in effect:—

Tariff.—For ores assaying 1,000 ounces or over per ton.

Silver.—Pay for 95 per cent of the silver contents at New York quotation.

Treatment Charge.—\$7 per ton of 2,000 pounds, dry weight.

Arsenic.—An addition to the working charge will be made at the rate of 25 cents per dry ton for each per cent of arsenic in excess of five per cent. Sampling free.

Payment.—Thirty days after agreement of assays.

For ores under 1,000 ounces and over 60 ounces per ton.

Silver.—Payment for 95 per cent of the silver contents at the New York quotation.

Treatment Charge.—\$7 per ton of 2,000 pounds, dry weight.

Arsenic.—An addition to the working charge will be made at the rate of 25 cents per dry ton for each per cent of arsenic in excess of 15 per cent.

Payment.—Cash settlement on agreement of assays.

*6. Balbach Smelting and Refining Company, Newark, N.J., U.S.A.*

This smelting company has not been offering a regular schedule for silver ores from the Cobalt district. It did, however, make some purchases during the year, returning 93 per cent of the silver contents in ores assaying about 2,000 ounces silver per ton.

*7. Beer, Sondheimer and Company, Frankfort-on-Main, Germany.*

"At the beginning of 1911, a few purchases of silver ores from Cobalt were made by the New York agency of Beer, Sondheimer and Company, but now the Company is out of the market for these ores.

*8. Pennsylvania Smelting Company, Pittsburgh, Pa., U.S.A.*

"The smelting schedule of the Pennsylvania Smelting Company, on the 1st of January, 1912, was the same as that which ruled throughout 1911, except that  
29976—9½

on ores running over 2,800 ounces of silver per ton a sliding scale is offered which gives a better percentage recovery to the shipper in proportion as the ore increases in silver contents. It is now as follows:—

Schedule for ores below 2,800 ounces.

For ores containing less than 200 ounces of silver to the ton, we will pay the New York silver price, less  $\frac{3}{4}$  cent per ounce for 95 per cent of the silver contents, less treatment charge of \$8 per ton.

For ores containing 200 to 400 ounces silver per ton, we will pay the New York silver price, less  $\frac{1}{2}$  cent per ounce for 95 per cent of the silver contents, less treatment charge of \$8 per ton.

For ore containing 400 to 2,000 ounces silver to the ton, we will pay the New York silver price, less  $\frac{1}{4}$  cent per ounce for 95 per cent of the silver contents, less a treatment charge of \$8 per ton.

For ores and coarse concentrates containing 2,000 ounces and upwards of silver per ton, we will pay the full New York silver price, for 95 per cent of the silver contents, no treatment charge.

For Vanner or Wilfley products, we will pay the New York silver price, less one cent per ounce for 94 per cent of the silver contents, less \$8 per ton treatment charge.

For jig concentrates containing from 400 to 2,000 ounces silver per ton, we will pay the New York silver price, less  $\frac{1}{2}$  cent per ounce for 95 per cent of the silver contents, less treatment charge of \$8 per ton.

Low grade 'ores' are expected to run less than 10 per cent arsenic.

All the above f.o.b. cars our works, Carnegie, Pa., P.C.C. and St. Louis railway.

Schedule for ores above 2,800 ounces:—

No treatment or refining charge.

For ores between 2,800 and 3,000 ounces, 95 $\frac{1}{2}$  per cent of the silver contents is paid for, and increase in the percentage of silver paid for by  $\frac{1}{10}$  of 1 per cent for every 200 ounces up to 4,800 ounces per ton. For ores assaying over 4,800 ounces the percentage of silver paid for is constant at 96 $\frac{1}{2}$  per cent. All other conditions are the same as for ores below 2,800 ounces.

Settlement assays to be the average of our results and shippers or shippers' representatives, if within splitting limits, otherwise reserve sample to be sent to umpire.

Splitting limits on ores of less than 150 ounces per ton to be 1 $\frac{1}{2}$  ounces, on ores of 150 ounces and less than 500 ounces, 1 per cent of contents, on ores of more than 500 ounces 8-10ths of 1 per cent of contents.

*9. Government Smelter, Saxony.*

"The Government Smelter of Saxony has been receiving some high grade ore from Cobalt on the following contract basis:—

Pay for 96 per cent silver contents on Hamburg quotation of silver.

Payment, 30 days after arrival in Hamburg.

Ore must assay at least 4,500 ounces silver per ton.

Above contract is made on a minimum of six cars.

*10. United States Metals Refining Company, New York—Works at Chrome, N.J., U.S.A.*

“The silver ores from Cobalt that are being purchased by this Company are comparatively low grade, the richest containing 400 ounces silver per ton. No regular schedule is published, but the prices vary with the character of the ore purchased.”

A number of the shipping companies at Cobalt have published, in annual reports, some details of their operations, from which the following extracts have been taken:—

**Coniagas Mines, Limited, Year Ending October 31, 1911.**

**TOTALS OF SHIPMENTS FROM THE MINE.**

Year.	Ore.		Concentrates.		Total.	
	Tons.	Ozs.	Tons.	Ozs.	Tons.	Ozs.
Nov. 1st-Oct. 31st.	289	657,513			289	657,513
1905-1906.....	2,655	1,341,372			2,655	1,341,372
1906-1907.....		*			627·5	1,457,210
1907-1908.....	350	807,253	426	599,975	776	1,407,228
1908-1909.....	330·1	979,630	645·5	949,901	975·6	1,929,531
1909-1910.....	619·1	2,142,536	1,418·4	1,643,616	2,037·5	3,789,274
1910-1911.....						
Total to Oct. 31, 1911. . .	4,243·2	5,928,304	2,489·9	3,193,492	7,360·6	10,582,128

\* Ore and concentrates.

A canvas table plant has been installed and operating since January 1, which enables us to recover a low grade concentrate which was previously going to waste.

The total amount milled during the year was 52,320 tons, averaging 36·3 ounces per ton. The average value of tailings from the mill was 4·75 ounces per ton.

## Crown Reserve Mining Company, Limited, Year Ending December 31, 1911.

## SHIPMENTS.—TOTAL PRODUCTION.

Shipments.	Weight.	Silver.	Gross value.	Treatment.	Net value.
	Tons.	Ozs.	\$ cts.	\$ cts.	\$ cts.
High grade.....	644·561	2,991,404	1,605,568 90	71,937 34	1,533,631 56
Low grade.....	390·256	64,284	33,862 33	8,319 62	25,542 71
Bullion.....	7·952	221,792	114,037 38	1,371 37	112,666 01
	1,042·769	3,277,480	1,753,468 61	81,628 33	1,671,840 28
Milled ore (shipped as bullion) .....	5·820	153,422	80,048 19	588 26	79,459 93
Total shipments.....	1,048·589	3,430,902	1,833,516 80	82,216 59	1,751,300 21

## TOTAL SHIPMENTS TO DATE.

Year.	Dry wt. Tons.	Gross oz.	Gross value.	Net value.	Cost per oz.
			\$ cts.	\$ cts.	Cts.
1908.....	650·78	1,798,954	910,350 62	854,788 89	7·508
1909.....	3,093·00	4,034,325	2,080,156 08	1,895,484 92	10·31
1910.....	2,753·00	3,248,196	1,757,824 27	1,633,716 66	11·97
1911.....	1,048·59	3,430,902	1,833,516 80	1,751,300 21	10·671
Total.....	7,545·37	12,512,377	6,581,847 77	6,136,290 68	

## Mine development to end of 1911:—

Sinking and raising.....	1,790 feet.
Drifting.....	5,247 “
Cross-cutting.....	5,172 “

Total..... 12,209 “

## Kerr Lake Mining Company, Year Ending August 31, 1911.

“The total development to August 31, 1911, is 21,946 feet, equal to a little over four miles.

“The costs of production per ounce are as follows:—

Mining and development costs.....	9·71 cents.
Shipment and treatment charges.....	4·59 “
Administration and general.....	0·39 “

Total..... 14·69 “

“The cost has been somewhat increased by reason of a larger proportion of development work compared with stoping during the year.”

# The La Rose Consolidated Mines Company, Year Ending December 31, 1911.

## TOTAL SHIPMENTS TO DECEMBER 31, 1911.

	Dry tons.	Ounces silver.	Gross value. Silver by-pro- duct paid for.	Net value re- ceived from smelter.
			\$ cts.	\$ cts.
Previous to May 31, 1908....	5,583·0000	2,675,161·00	1,711,422 00	1,504,707 00
May 31, '08, to May 31, '09.	6,063·6705	2,915,706·58	1,516,881 55	1,320,698 25
May 31, '09, to May 31, '10.	6,313·9050	3,100,443·93	1,632,416 76	1,442,192 98
May 31, '10, to Dec. 31, '10.	2,380·6085	2,118,574·25	1,147,276 36	1,040,933 98
During year 1911.....	3,561·4120	4,092,709·33	2,191,524 34	2,014,391 49
Total.....	23,902·5960	14,902,595·09	8,219,521 01	7,322,923 70

Development work done during 1911, 11,045 feet shafts, drifts, cross-cuts, and raises, stoping 13,589 cubic yards, trenches 15,095 feet.

## SUMMARY OF SHIPMENTS.

Dry tons shipped.....	3,561·412
Gross ounces of silver contained....	4,092,709·33
Gross silver value.....	\$2,191,524·34
Average price received per ounce—cents.....	53·55
Smelter deduction freight and treatment.....	177,132·85
Net value received from ore sales.....	\$2,014,391·49

# Nipissing Mines Company, Year Ending December 31, 1911.

## TOTAL SHIPMENTS TO DECEMBER 31, 1911.

Year.	Dry weight.	Gross silver.	Gross value silver, plus by- products paid for.	Net value returned from smelter.
	Lbs.	Ozs.	\$ cts.	\$ cts.
1904.....	124,659	32·13	24,163 90	23,887 52
1905.....	929,373	753,153·90	505,638 28	471,666 61
1906.....	4,019,494	2,214,821·60	1,576,852 94	1,421,655 54
1907.....	4,804,426	2,239,551·89	1,373,088 57	1,234,492 35
1908.....	7,009,998	2,893,031·44	1,526,686 32	1,364,478 05
1909.....	12,825,169	4,646,869·21	2,417,767 21	2,180,407 02
1910.....	13,397,860	5,597,778·61	3,008,000 98	2,742,321 23
1911.....	5,829,254	4,678,074·14	2,507,196 98	2,381,712 54
Total.....	48,950,233	23,023,312·92	12,939,395 18	11,820,620 84

The mill for the treatment of first class ore was started February 1, 1911, and is now successfully treating the entire product of the mine.

The process, which is a new one as far as its application to Cobalt ores is concerned, was devised by Charles Butters and his assistant, G. H. Clevenger;



James Johnston erected the plant and has had charge of it since. The process consists essentially of amalgamation in cyanide solution in a tube mill where more than 97 per cent of the silver in the ore is recovered as amalgam. The residue then undergoes regular cyanide treatment whereby an additional extraction is made. During the summer a refinery was erected, since which time the whole product of the mill has been shipped as fine bullion.

Trenching was confined to the section south and east of Peterson lake.

A force of 25 men completed 13.7 miles of trenches 2.7 feet deep at a cost of \$8,831.58.

Summary of underground work in 1911:—

Drifting, 3,675 feet; cross-cutting, 3,602; raising, 1,208; sinking, 296; total, 8,781 feet. Stopping, 13,841 cubic yards.

### McKinley-Darragh Mines of Cobalt, Ltd., Calendar Year, 1911.

“Extent of mining operations:—

McKinley-Darragh to January 1, 1912, 20,066 feet drifts, cross-cuts, raises winzes, and shafts; Savage, to January 1, 5,955 feet.

“Mill report:—

Total ore treated, 1911, 46,497 tons.

Number stamp days run, 318.66.

Average tons per day, 145.91.

Mill heads, 39.685.

Mill tails, 4.122.

Per cent of extraction, 89.614.

Ounces of silver recovered, 1,653,595.”

### Timiskaming Mining Company, Limited, Calendar Year, 1911.

#### SUMMARY OF PROGRESS.

Class of work.	Year 1911.	Since commencement of operations.
Shaft sinking.....	112.0	958.0
Winzes and raises.....	353.8	1,100.8
Drifting.....	2,184.2	8,549.2
Cross-cutting.....	936.0	2,202.0
	3,586.0	12,810.0

Total depth of No. 2 shaft from collar equals 628.0 feet.

## PROSPECTING, DEVELOPMENT, AND MINING COST PER TON.

24,783 tons ore elevated.

40,937 tons ore and waste elevated.

	Cost per ton, ore.	Cost per ton, ore and waste.
	\$ cts.	\$ cts.
Prospecting .....	1 32	0 80
Development.....	1 67	1 01
Mining and timbering.....	2 98	1 80
Hoisting.....	0 88	0 54
Cost to surface.....	6 85	4 15

" No payment was made this year on any of the by-products, cobalt, nickel, or arsenic. On the other hand we were penalized on an excess arsenic content by some of the smelters.

" The 34,720 tons treated in the mill produced 770 tons of shipping product which gives a ratio of concentration of about 45 into 1.

" The stamp duty was about 3.13 tons per 24 hours which is somewhat better than that of last year.

" The milling cost per ton covering all charges..... was \$3.00 per ton as compared with \$3.86 of last year, an improvement of 86 cents per ton."

**British Columbia.**

The chief sources of the silver production in this Province are the silver-lead ores of East and West Kootenay, supplemented by the silver contained in the gold-copper-silver ores of Rossland, Boundary, and Coast districts. The production in 1911, based on smelter recoveries, was 1,887,147 ounces, valued at \$1,005,924.

The leading silver producers among the mines of the Province in order of importance are the Van Roi, Sullivan, Rambler-Cariboo, St. Eugene, Ruth, and Standard.

The Granby mines at Phoenix on account of their large tonnage of copper ores come fourth as silver producers, with the others maintaining their relative positions.

Considerable attention is being paid to the silver-lead properties of the Slocan district, with probabilities of increased production, from the Sandon, Silverton, and Ainsworth camps. The following table is taken from the annual report of the Minister of Mines for British Columbia, 1911:—

SILVER.—TABLE 3.

## Production in British Columbia by Districts, 1907-1911.\*

	1907.	1908.	1909.	1910.	1911.
	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.
Cassiar.....	2,291	14,169	4,569	1,454	29,976
Kootenay East—					
Fort Steele division.....	821,367	641,855	580,240	501,475	330,235
Other divisions.....	3,955	3,384	825	243	
Kootenay West—					
Ainsworth division.....	301,322	314,142	352,555	233,010	77,375
Nelson ".....	236,837	25,067	75,908	45,787	76,774
Slocan ".....	590,998	848,595	738,175	964,634	793,926
Trail Creek ".....	126,661	129,558	80,026	87,833	88,076
Other divisions.....	122,232	173,675	169,435	107,753	67,884
Yale—					
Boundary.....	469,206	451,323	492,333	460,945	326,849
Yale.....	223	23		3	343
Coast and other districts.....	70,356	29,598	38,676	47,104	100,926
Total.....	2,745,448	2,631,389	2,532,742	2,450,241	1,892,364

\* From the Minister of Mines Reports, British Columbia.

## Yukon.

The figures of silver production of the Yukon, given in Table 2, represent the silver alloyed with the placer gold, together with a small amount from the lode mines of the district. On an average, about one ounce of silver is contained in each five ounces of crude bullion from the alluvial workings. In 1909, the production was 45,000 ounces of silver, all from the placer mines. In 1910, the placer production was 50,000 ounces, valued at \$26,743, and the lode production 37,418 ounces, valued at \$20,013, or a total of 87,418 fine ounces valued at \$46,756. In 1911 the placer production was 50,300 ounces, valued at \$26,812, and the lode production 62,408 ounces, valued at \$33,266, a total of 112,708 fine ounces with a value of \$60,078.

## Exports.

The following table shows the statistics of silver contained in ore, matte, or other form exported from Canada since 1886, as compiled from the reports of Trade and Navigation published by the Customs Department. The exports during 1911 were 31,216,725 ounces, valued at \$15,807,366, as against exports of 30,699,270 ounces, valued at \$15,649,537, in 1910.

## SILVER.—TABLE 4.

## Exports of Silver in Ore, etc.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1886 .....	25,957	1895 .....	994,354	1904 .....	1,904,394
1887 .....	206,284	1896 .....	2,271,959	1905 .....	2,777,218
1888 .....	219,008	1897 .....	3,576,391	1906 .....	5,686,444
1889 .....	212,163	1898 .....	2,902,277	1907 .....	9,941,849
1890 .....	204,142	1899 .....	1,623,905	1908 .....	12,403,482
1891 .....	225,312	1900 .....	2,341,872	1909 .....	15,719,909
1892 .....	56,688	1901 .....	2,026,727	1910 .....	15,649,537
1893 .....	213,695	1902 .....	1,820,058	1911 .....	15,807,366
1894 .....	359,731	1903 .....	1,989,474		

## ZINC.

The production of zinc ore in Canada in 1911, as obtained by direct returns from the producers, was 2,590 tons valued at \$101,072, the greater part being from British Columbia. The zinc content of these shipments was returned as 2,346,849 pounds, which if valued at the average New York price of spelter during the year would be worth \$135,132.

The ore shipped from British Columbia contains also a varying silver content, for which payment is made by the smelters and without which on account of the import duty to the United States and the long rail haul, it would not pay to ship. The Richardson, or Long Lake mine, in Olden township, Frontenac county, Ontario, did not ship during 1911.

The British Columbia shipments were seriously reduced as a result of the destruction of mills, mine buildings, and railway facilities by the forest fires of 1910, there being only two shippers in 1911.

The British Columbia zinc ore is exported for treatment to Kansas and Oklahoma smelters, and since the smelters demand over 30 per cent zinc, the maximum rate of the United States customs tariff affects Canadian ores.

The present schedule of the tariff on zinc is as follows:—

Ores containing less than 10 per cent, free of duty. "

Ores containing 10 per cent or more, and less than 20 per cent,  $\frac{1}{4}$  cent per pound.

Ores containing 20 per cent or more, and less than 25 per cent,  $\frac{1}{2}$  cent per pound.

Ores containing 25 per cent or more, 1 cent per pound.

All rates being based on the metallic contents of the zinc.

The United States smelters usually pay on a basis of 45 per cent zinc content. The base price varies with the price of spelter at St. Louis, and a stated amount is added or deducted for every unit of zinc in excess of or less than the base. The silver is settled for at the New York price after making deductions for losses in treatment. Limits are frequently set which lead or iron contents may not exceed.

A typical example may be given. A certain mine was paid \$28.50 per short ton for zinc concentrates carrying 45 per cent zinc, when spelter was quoted at 5 cents per pound at St. Louis. For every unit above or below 45 per cent zinc 85 cents was added or deducted. For every increase or decrease of one cent per pound in the price of spelter at St. Louis, an increase or decrease was allowed of \$7 per ton of 2,000 pounds, and proportionately for fractions thereof. In the case of the silver content, six ounces per ton were deducted and 75 per cent of the remainder paid for at the New York price.

The sellers paid freight, customs duty, and collection charges.



The imports of zinc taken as an index of consumption, show a fairly steady increase. The total imports of zinc in blocks and pigs and spelter were, in 1880, some 744 tons. In 1889 they had risen to 1,427 tons, and remained fairly stationary until about 1899, in which year the imports were 1,213 tons. In the fiscal year ending March, 1909, they had risen to 4,610 tons, and for the calendar year, 1910, they totalled 7,037 tons, in addition to which there were 4,248 tons of zinc white, and zinc manufactures, to the value of \$21,829.

For the calendar year 1911, the total imports were 7,534 tons, in addition to which there were 4,269 tons of zinc white, and zinc manufactures to the value of \$30,862.

Statistics of the production and imports of zinc and the average monthly prices of spelter on the New York and London markets for two years are given in the accompanying tables:—

ZINC.—TABLE 1.

## Annual Production of Zinc.

Calendar Year.	ZINC ORE SHIPPED.		METALLIC ZINC IN ORE SHIPPED.	
	Tons.	Spot value.	Lbs.	Final value.
		\$		\$
1898.....	1,162	11,000	788,000	36,011
1899.....	865	18,165	814,000	46,805
1900.....	261	4,810	212,000	9,342
1901.....				
1902.....	158	1,659	142,200	6,882
1903.....	1,000	10,500	900,000	48,660
1904.....	597	3,700	477,568	24,256
1905.....	9,413	139,200	*	*
1906.....	1,154	23,800	*	*
1907.....	1,573	49,100	*	*
1908.....	452	3,215	*	*
1909 (a).....	18,371	242,699	16,468,204	906,245
1910.....	5,063	120,003	4,361,712	240,766
1911.....	2,590	101,072	2,346,845	135,132

\* Figures not available.

(a) Includes 7,424 tons shipped late in 1908.

## ZINC.—TABLE 2.

## Imports of Zinc in Blocks, Pigs, and Sheets.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$			\$
1880 .....	13,805	67,881	1891. ....	17,984	105,023	1902 .....	34,871	141,560
1881 .....	20,920	94,015	1892. ....	21,881	127,302	1903 .....	26,646	142,827
1882 .....	15,021	76,631	1893. ....	26,446	124,360	1904 .....	25,553	138,057
1883 .....	22,765	94,799	1894. ....	20,774	90,680	1905 .....	25,141	141,514
1884 .....	18,945	77,373	1895. ....	15,061	63,373	1906 .....	24,462	158,438
1885 .....	20,954	70,598	1896. ....	20,223	80,784	1907 (9 mos.)	18,427	126,221
1886 .....	23,146	85,599	1897. ....	11,946	57,754	1908 .....	30,362	191,081
1887 .....	26,142	98,557	1898. ....	35,148	112,785	1909 .....	26,222	141,066
1888 .....	16,407	65,827	1899. ....	18,785	107,477	1910 .....	35,040	201,777
1889 .....	19,782	83,935	1900. ....	28,748	156,167	1911 .....	34,659	206,746
1890 .....	18,236	92,530	1901. ....	20,527	103,457			

## ZINC.—TABLE 3.

## Imports of Spelter.\*

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$			\$
1880 .....	1,073	5,301	1891. ....	6,249	31,459	1902 .....	18,356	80,757
1881 .....	2,904	12,276	1892. ....	13,909	62,550	1903 .....	23,159	110,817
1882 .....	1,654	7,779	1893. ....	10,721	49,822	1904 .....	33,952	164,751
1883 .....	1,274	5,196	1894. ....	8,423	35,615	1905 .....	37,941	206,244
1884 .....	2,239	10,417	1895. ....	9,249	30,245	1906 .....	50,137	290,686
1885 .....	3,325	10,875	1896. ....	10,897	40,548	1907 (9 mos.)	42,465	269,044
1886 .....	5,432	18,238	1897. ....	8,342	32,826	1908 .....	65,593	314,369
1887 .....	6,908	25,007	1898. ....	2,794	13,561	1909 .....	55,981	310,688
1888 .....	7,772	29,762	1899. ....	5,450	29,687	1910 .....	132,001	658,285
1889 .....	8,750	37,403	1900. ....	5,836	29,416	1911 .....	98,372	505,447
1890 .....	14,570	71,122	1901. ....	14,621	58,283			

\* Spelter in blocks and pigs.

## ZINC.—TABLE 4.

## Imports of Zinc, Manufactures of.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880	8,327	1891	7,178	1902	6,683
1881	20,178	1892	7,563	1903	9,754
1882	15,526	1893	7,464	1904	12,682
1883	22,599	1894	6,193	1905	11,912
1884	11,952	1895	5,581	1906	12,917
1885	9,459	1896	6,290	1907 (9 mos.)	12,556
1886	7,345	1897	5,145	1908	19,240
1887	6,561	1898	10,503	1909	15,621
1888	7,402	1899	14,661	1910	15,495
1889	7,233	1900	11,475	1911	24,128
1890	6,472	1901	6,882		
1911 { Zinc seamless drawn tubing.....			Duty free	\$	.....
" manufactures of, N.O.P.....			25%	\$	24,128
Total.....				\$	24,128

## World's Production of Spelter in Short Tons.\*

Country.	1906.	1907.	1908.	1909.	1910.	1911.
Australia.....	1,131	1,098	1,198	.....	560	1,120
Austria and Italy.....	11,883	12,522	14,063	13,931	14,666	15,350
Belgium.....	168,067	170,307	181,851	184,194	190,233	215,062
France and Spain.....	59,293	61,438	61,512	61,859	65,191	70,795
Germany—						
Rhine district.....	75,729	77,459	80,670	82,863	86,823	103,863
Silesia.....	150,282	152,611	158,328	159,731	154,596	172,161
Great Britain.....	57,971	61,286	60,029	65,422	69,531	73,808
Holland.....	16,150	16,526	19,017	21,548	23,121	25,060
Poland.....	10,595	10,735	9,740	8,758	9,514	10,640
United States.....	224,770	249,860	210,424	255,760	269,184	286,526
Total.....	775,871	813,842	796,832	854,066	883,419	974,385

\* Mineral Resources of the United States 1911.

## World's Consumption of Spelter in Short Tons.\*

Country.	1907.	1908.	1909.	1910.
Austria-Hungary.....	34,171	35,925	36,155	37,258
Belgium.....	60,627	74,936	68,343	86,531
France.....	76,720	85,956	73,744	61,949
Germany.....	192,792	198,580	207,232	196,209
Great Britain.....	154,653	152,627	171,408	195,989
Holland.....	4,189	4,188	4,409	4,409
Italy.....	7,496	9,257	9,039	8,929
Russia.....	19,290	19,946	20,282	27,447
Spain.....	5,180	5,290	4,850	4,740
United States.....	13,228	11,020	6,614	13,228
Other countries.....	226,969	214,167	270,730	245,884
Total.....	795,315	811,892	872,806	882,573

\* Mineral Resources of the United States, 1910.

## Average Price of Spelter in Cents per Pound at New York.\*

Month.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.
January	4.13	4.27	4.865	4.863	6.190	6.457	6.732	4.513	5.141	6.101	5.452
February	4.01	4.15	5.043	4.916	6.139	6.075	6.814	4.785	4.889	5.569	5.518
March	3.91	4.28	5.349	5.057	6.067	6.209	6.837	4.665	4.757	5.637	5.563
April	3.98	4.37	5.550	5.219	5.817	6.087	6.687	4.645	4.965	5.439	5.399
May	4.04	4.47	5.639	5.031	5.434	5.997	6.441	4.608	5.124	5.191	5.348
June	3.99	4.96	5.697	4.760	5.190	6.096	6.419	4.543	5.402	5.128	5.520
July	3.95	5.27	5.662	4.873	5.396	6.006	6.072	4.485	5.402	5.152	5.695
August	3.99	5.44	5.725	4.866	5.706	6.027	5.701	4.702	5.729	5.279	5.953
September	4.08	5.49	5.686	5.046	5.887	6.216	5.236	4.769	5.796	5.514	5.869
October	4.23	5.38	5.510	5.181	6.087	6.222	5.430	4.801	6.199	5.628	6.102
November	4.29	5.18	5.038	5.513	6.145	6.375	4.925	5.059	6.381	5.976	6.380
December	4.31	4.78	4.731	5.872	6.522	6.593	4.254	5.137	6.249	5.624	6.301
Year	4.07	4.84	5.40	5.100	5.822	6.198	5.962	4.726	5.503	5.520	5.758

\* From the statistical publication of the Metallgesellschaft, etc., of Frankfort-on-the-Main, Germany.

## Average Prices of Spelter, Ordinary Brands, in London.\*

Month.	1902.			1903.			1904.			1905.			1906.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January	16	13	..	20	0	8	21	11	2	24	19	9	28	8	2
February	17	14	2	20	15	4	21	16	5	24	10	6	26	2	4
March	17	13	4	22	18	2	21	19	6	23	13	6	24	15	3
April	17	17	..	22	8	7	22	5	1	23	14	3	25	19	3
May	18	9	..	21	2	4	22	2	10	23	11	8	27	9	9
June	18	11	8	20	8	2	21	14	6	23	16	8	26	15	11
July	18	19	11	20	8	5	22	2	9	23	19	6	27	15	11
August	18	16	8	20	9	5	22	7	6	24	14	6	27	0	5
September	19	4	7	20	17	7	22	11	5	26	8	3	27	12	5
October	19	5	4	20	9	4	23	1	7	28	1	7	27	18	10
November	19	11	8	20	14	7	24	12	9	28	5	11	27	15	1
December	19	15	6	20	19	10	24	17	1	28	14	11	27	19	3
Year	18	0	11	20	19	5	22	11	10	25	7	7	27	1	5

Month.	1907.			1908.			1909.			1910.			1911.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January	27	7	1	20	6	3	21	6	3	23	4	2	23	17	9
February	26	1	5	21	0	7	21	8	9	23	3	1	23	5	6
March	26	4	8	21	1	5	21	8	8	23	0	7	23	0	4
April	25	17	5	21	6	1	21	10	1	22	9	10	23	14	10
May	25	14	2	20	2	10	21	19	..	22	1	1½	24	7	6
June	24	10	2	19	2	2	21	19	11	22	3	2	24	12	3
July	23	18	11	18	14	1	21	18	9	22	5	5	25	0	1
August	22	1	7	19	6	9	22	0	3	22	14	0	26	6	0
September	21	0	11	19	10	2	22	17	1	23	2	7	27	15	0
October	21	12	11	19	15	1	22	3	4	23	16	6	27	5	1
November	21	8	4	20	17	1	23	2	1	24	1	9	26	15	1
December	20	3	3	20	19	2	23	1	3	24	0	5	26	17	0
Year	23	16	9	20	3	5	22	3	..	23	1	0	25	5	8

\* From the annual publication of the Metallgesellschaft, etc., of Frankfort-on-the-Main, Germany.

## MISCELLANEOUS METALLIC MINERALS.

### ALUMINIUM.

No commercial ores of aluminium have as yet been found in Canada. Aluminium is, however, made in extensive works at Shawenegan Falls, Que., from bauxite ores imported from France, Germany, and the United States, by the Northern Aluminium Company. A wire mill for the manufacture of aluminium wire and cables is also operated by the same firm.

There being but one firm engaged in the manufacture of aluminium, we are precluded from publishing statistics of production.

Imports of alumina, which probably includes bauxite, and exports of aluminium, are, however, published in the reports of the Department of Customs.

During the twelve months ending December 31, 1911, the imports of alumina were 18,607,200 pounds, or 9,304 tons, while the exports of aluminium in ingots, bars, etc., during the same period, were 4,990,100 pounds, or 2,495 tons, besides manufactures of aluminium, valued at \$1,555. The imported alumina was valued at 2.00 cents per pound, and the exported aluminium at 14.98 cents.

The imports of alumina and exports of aluminium during the past eight years are shown in tabular form as follows:—

Annual Imports of 'Alumina' and Exports of Aluminium.

Calendar Year.	Imports of alumina.		EXPORTS OF ALUMINIUM.		
			Ingots, bars, etc.		Manufactures.
	Lbs.	Value. \$	Lbs.	Value. \$	Value. \$
1905 .....	5,360,800	138,765	2,535,386	508,219	1,588
1906 .....	8,975,400	239,136	4,521,486	899,113	2,244
1907 .....	12,705,300	268,502	5,478,203	1,109,353	1,499
1908 .....	1,485,500	29,752	1,713,800	399,785	1,727
1909 .....	11,794,100	234,544	6,134,500	918,195	3,453
1910 .....	19,464,400	403,283	7,722,400	1,160,242	3,741
1911 .....	18,607,200	372,009	4,990,100	747,587	1,555

*Prices.*—The price of aluminium (No. 1 ingots), in New York, during 1911, varied between the limits of 18½ and 22 cents per pound; during 1910, the price varied between 20 and 24 cents per pound, while practically the same prices ruled during 1909.

In Europe, prices for aluminium for several years have been considerably lower than in the United States.

In 1909, the prices per pound at works in Europe are reported by the 'Metallgesellschaft' as having ranged from 13½ cents to 16 cents; in 1910, from 14 cents to 17½ cents, and in 1911 from 11 to 13½ cents.



## ANTIMONY.

A few pounds of refined antimony were produced at Trail, British Columbia, in 1911, but beyond that there was no production from Canada. The West Gore Antimony Company did not operate during the year.

The total production of antimony in 1910, as reported to this Branch, consisted of 364 tons of antimony concentrates, valued at \$13,906, shipped from West Gore, Nova Scotia. In 1909, in addition to the shipment of 35 tons of concentrates, there were produced about 61,200 pounds of antimony metal chiefly at the works of the Canadian Antimony Company, Limited, at Lake George, New Brunswick, a small recovery being also reported from the Consolidated Mining and Smelting Company's refinery at Trail, B.C.

In 1908, customs returns showed an export of 148 tons of antimony ore valued at \$5,443.

In 1907 the production was 2,016 tons of antimony ore shipped, valued at \$65,000, and 63,850 pounds of refined antimony, valued at \$5,108.

In British Columbia, some of the lead ores contain a small percentage of antimony—about one-third of one per cent—and some refined antimony was recovered at Trail in 1907 and 1909, the recovery being somewhat irregular.

The auriferous antimony property at West Gore, Hants county, Nova Scotia, formerly operated by the Dominion Antimony Company, Limited, was taken over in July, 1909, by the West Gore Antimony Company.

The mine and works of the Canadian Antimony Company, Ltd., at Lake George, New Brunswick, have not been in operation since 1909.

### Annual Shipments of Antimony Ore.\*

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	665	31,490	1899 to 1904 .....	Nil.	Nil.
1887.....	584	10,860	1905 (a).....	527	.....
1888.....	345	3,696	1906 (a).....	782	.....
1889.....	55	1,100	1907*.....	2,016	65,000
1890.....	26½	625	1908 (b).....	148	5,443
1891.....	10	60	1909*.....	35	1,575
1892 to 1897.....	Nil.	Nil.	1910.....	364	13,906
1898.....	1,314	20,000	1911.....	.....	.....

(a) As recorded by the Nova Scotia Department of Mines: no value given.

(b) Exports.

\* In addition to the shipments shown in the table, refined antimony was produced in 1907 to the extent of 63,850 pounds valued at \$5,108, and in 1909, 61,207 pounds valued at \$4,285.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1880.....	40	1,948	1899.....	63 $\frac{1}{2}$	190
1881.....	34	3,308	1900.....	210	3,441
1882.....	323	11,673	1901.....	10	1,643
1883.....	165	4,200	1902.....	90	13,658
1884.....	483	17,375	1903.....	33	4,332
1885.....	758	36,250	1904.....	160	7,237
1886.....	665	31,490	1905.....	525	27,118
1887.....	229	9,720	1906.....	420	17,064
1888.....	352 $\frac{3}{4}$	6,894	1907.....	1,327	37,807
1889.....	30	695	1908.....	148	5,443
1890.....	38	1,000	1909.....	4	120
1891.....	3 $\frac{1}{2}$	60	1910.....	239	14,095
1892 to 1897.....	Nil.	Nil.	1911... ..	57	4,946
1898.....	1,232	15,295			

### Imports of Antimony.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	42,247	5,903	1896.....	163,209	9,557
1881.....		7,060	1897.....	134,661	8,031
1882.....	183,597	15,044	1898.....	156,451	12,350
1883.....	105,346	10,355	1899.....	289,066	16,851
1884.....	445,600	15,564	1900.....	186,997	20,001
1885.....	82,012	8,182	1901.....	350,737	24,714
1886.....	89,787	6,951	1902.....	504,822	39,276
1887.....	87,827	7,122	1903.....	868,146	65,434
1888.....	120,125	12,242	1904.....	418,943	27,112
1889.....	119,034	11,206	1905.....	186,454	12,828
1890.....	117,066	17,439	1906.....	403,918	56,297
1891.....	114,084	17,483	1907 (9 mos. ).....	321,385	71,493
1892.....	180,308	17,680	1908.....	484,899	66,484
1893.....	181,823	14,771	1909.....	444,254	32,133
1894.....	139,571	12,249	1910.....	563,662	40,681
1895.....	79,707	6,131	1911.....	640,208	42,234
1911	{ Antimony, or regulus of, not ground, pulverized or 				

## COBALT.

Cobalt is an important constituent of the silver-cobalt-nickel-arsenides of Coleman and adjacent townships, more familiarly known as the Cobalt district, Province of Ontario, and these ores are now said to be the principal source of the world's consumption of cobalt.

With respect to the greater part of the ore shipped in which silver is the chief constituent of value, the purchasing smelters make no allowance for the cobalt content, and the mine owners, therefore, receive nothing for the cobalt.

The recovery of cobalt in Canada so far has been confined to the production of cobalt oxide and mixed cobalt and nickel oxides, by the Coniagas Reduction Company and the Deloro Mining and Reduction Company. During 1911, according to direct returns, there were produced 154,174 pounds of cobalt and nickel oxides and 1,260,832 pounds of cobalt material and mixed oxides of cobalt and nickel, the total value of all these products being \$221,690.

No information is available as to the quantities recovered from ores shipped to smelters outside of Canada.

It is also estimated that the total ore shipments from Cobalt during the past eight years have contained upwards of 5,901 tons of metallic cobalt.

The following table shows the ore shipments, estimated cobalt content, and value received by the shippers for cobalt, as published by the Ontario Bureau of Mines:—

Year.	Ores shipped.	Estimated total cobalt content.	Per cent.	Value received by shippers for cobalt.
	Tons.	Tons.		\$
1904.....	158	16	10·1	19,960
1905.....	2,144	118	5·5	100,000
1906.....	5,335	321	6·0	80,704
1907.....	14,788	739	5·0	104,426
1908.....	25,624	1,224	4·7	111,118
1909.....	30,677	1,533	5·0	94,965
1910.....	34,232	1,098	3·2	54,699
1911.....	26,653	852	3·2	170,890

The production of cobalt has so largely exceeded the demand as to cause a very great fall in the price.

The price of cobalt oxide (78·6 per cent Co) in New York, during 1907, remained uniformly at \$2·50 per pound. In 1908, the price fell to \$1·45 in April, and \$1·40 in November. During the first three months of 1909, from \$1·45 to \$2·60 was quoted, after which the price again fell, quotations ranging from \$1·10 to \$1·75 until December. In the latter part of December there was a further falling off to prices ranging from 80 to 85 cents per pound.

During 1910 the price remained fairly constant at from 80 to 85 cents per pound, while in December, 1911, it fell to from 78 to 80 cents per pound.

In the "Statistique de l'Industrie Minérale en France et en Algérie" for 1910, the following statement is of interest: "The production of cobalt ores which was more than 2,360 metric tons in 1908 and which fell to 548 tons in 1909, was only 54 tons in 1910 with a value of 4,860 francs or an average of 90 francs per ton.

"Thus New Caledonia, which for a long time enjoyed a veritable monopoly of the cobalt ore market, was suddenly supplanted in these markets by Canada as a result of the exploitation of the argentiferous-cobalt ores of the Cobalt district."

In 1907 an Act was passed by the Ontario Legislature, authorizing the payment of bounties on certain nickel, cobalt, copper, and arsenic products mined and refined in the Province. The Act and Amendment are quoted following:—

#### AN ACT TO ENCOURAGE THE REFINING OF METALS IN ONTARIO.

Whereas it is desirable to encourage the refining of nickel, cobalt, copper and arsenic ores within the Province;

Therefore His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

1. This Act may be cited as "The Metal Refining Bounty Act."

2. The treasurer of the Province may, under the authority of such regulations as may from time to time be made in that behalf by the Lieutenant-Governor in Council, pay in each year to the refiners of the metals or metal compounds hereinafter specified, when refined in the Province from ores raised and mined in the Province, a bounty upon each pound of such metal or compound so refined as follows:—

Class 1.—On refined metallic nickel or on refined oxide of nickel, 6 cents per pound on the free metallic nickel or on the nickel contained in the nickel oxide; but nickel upon which a bounty has already been paid in one form of product shall not be entitled to any further bounty in any other form; and the amount to be paid as bounty on the nickel products herein mentioned is not to exceed in all \$60,000 in any one year.

Class 2.—On refined metallic cobalt or on refined oxide of cobalt, 6 cents per pound on the free metallic cobalt or on the cobalt contained in the oxide of cobalt; but cobalt upon which a bounty has already been paid in one form of product shall not be entitled to any further bounty in any other form; and the amount to be paid as bounty on the cobalt products herein mentioned is not to exceed in all \$30,000 in any one year.

Class 3.—On refined metallic copper or on refined sulphate of copper, 1½ cents per pound on the free metallic copper or on the copper contained in the sulphate of copper; or on any copper product carrying at least 95 per cent of metallic copper, one-half cent per pound; but copper upon which a bounty has



already been paid in one form of product shall not be entitled to any further bounty in any other form; and the amount to be paid as bounty on the copper products herein mentioned is not to exceed in all \$60,000 in any one year.

Class 4.—On white arsenic, otherwise known as arsenious acid, produced from mispickel ores and not from ores carrying smaltite or niccolite or cobaltite, one-half cent per pound; but the amount to be paid as bounty on the arsenic compound herein mentioned is not to exceed in all \$15,000 in any one year.

(1) Provided, however, that if so much of any of the above-mentioned classes of refined products is refined in the Province in any one year that the amount hereby set apart in respect of the said class would be insufficient to pay the bounties herein provided therefor, then the bounty payable to the refiners of such class of refined products shall abate and be payable upon a *pro rata* basis so that not more than the maximum amount herein specified for any of the said classes shall be paid in respect of said class in any one year.

(2) Provided, also, that the bounties herein provided for shall cease and determine with the payment of any sum or sums which shall have been earned during the period of five years from the passing of this Act.

(3) No person, firm or company shall be entitled to claim or receive any of the bounties in this Act provided for unless such person, firm or company shall have been at all times prepared and ready and willing during the period for which the bounty is claimed, to smelt, treat and refine ores from which the same product as that on which the bounty is claimed can be produced, belonging to any other person, firm or company, at rate and on terms and conditions approved by the Lieutenant-Governor in Council, or shall have been ready to purchase such ores at rates approved by the Lieutenant-Governor in Council as current market rates.

#### AN ACT TO AMEND THE ACT TO ENCOURAGE THE REFINING OF METALS IN ONTARIO.

His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

1. Subsection 2 of Section 2 of The Metal Refining Bounty Act is amended by striking out the word “five” where the same appears in the last line of the said Subsection, and substituting therefor the word “ten”.



## MERCURY.

There has been no production of mercury since 1897. The small production reported in 1895 and 1897 was derived from the deposits at the western end of Kamloops lake, B.C. These deposits consist of quartz veins containing pockets of cinnabar. These veins are in a zone of decomposed volcanic rock of Tertiary age.

During 1911 some development work was done by the Mercury Mines, Ltd., at Sechart, Vancouver island. Some ore was taken out but was piled on the dump for future treatment.

### Production of Mercury.

Calendar Year.	Flasks. (76½ lbs.)	Price per flask.	Value.
		\$ cts.	\$
1895.....	71	33 00	2,343
1896.....	58	33 44	1,940
1897.....	9	36 00	324

### Imports of Mercury.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$			\$
1882.....	2,443	965	1892.....	30,936	15,038	1902.....	97,283	56,615
1883.....	7,410	2,991	1893.....	50,711	22,998	1903.....	164,968	91,625
1884.....	5,348	2,441	1894.....	36,914	14,483	1904.....	151,107	80,658
1885.....	14,490	4,781	1895.....	63,732	25,703	1905.....	103,330	48,412
1886.....	13,316	7,142	1896.....	77,869	32,353	1906.....	150,364	69,505
1887.....	18,409	10,618	1897.....	76,058	33,534	1907 (9 mos.)...	98,368	45,662
1888.....	27,951	14,943	1898.....	59,759	36,425	1908.....	178,411	76,549
1889.....	22,931	11,844	1899.....	103,017	51,695	1909.....	92,220	46,217
1890.....	15,912	7,677	1900.....	85,342	51,987	1910.....	283,980	146,914
1891.....	29,775	20,223	1901.....	140,610	94,564	1911 Duty free.	128,980	74,956

## MOLYBDENUM.

Although there are numerous occurrences of molybdenite in Canada of more or less undetermined value, there has been very little production of the mineral.

In 1902, about 6,500 pounds of molybdenum, valued at \$400, were reported as having been taken from a deposit in the township of Laxton, county of Victoria, by John Webber, of Toronto.

In 1903, Mr. A. W. Chisholm, of Kingston, reported the shipment to the United States and elsewhere of 85 tons of molybdenum ore, valued at \$1,275, culled from about 500 or 600 tons of rock taken from the east half of lot 5, concession XIV, Sheffield township, Addington county.

According to "The Mineral Industry," published in New York: "The market for molybdenum ores is very narrow. The price fluctuates widely, and is generally subject to special negotiations at each particular sale. American buyers require concentrates to contain 90 to 95 per cent molybdenite, for which they will pay \$400 to \$450 per ton. The principal purchasers in the U.S. are Electrometallurgical Co. of America, New York; Primos Chemical Company, Primos, Penn.; DeGolia & Atkins, San Francisco, Cal. In Germany, Friederich Krupp, of Essen, is a large user of molybdenum."

During the year a report on the molybdenum ores of Canada was issued by the Mines Branch.<sup>1</sup>

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<sup>1</sup> No. 93, Report on the Molybdenum Ores of Canada, by T. L. Walker, Ph.D., Mines Branch, Dept. of Mines, Ottawa, 1911.

## PLATINUM AND PALLADIUM.

Although no production of platinum or palladium is reported for 1910, it seems probable that some recovery of platinum may have been made from placer mining on the Tulameen river, B.C.

In the former years the chief source of the platinum production in Canada was the placer gravels of British Columbia, principally in the Similkameen district.

The nickel-copper ores of the Sudbury district also carry small quantities of the metals of the platinum group, and from 1902 to 1906 considerable quantities of these metals were recovered from accumulated residues resulting from the treatment of the mattes from Sudbury. This recovery, however, has apparently ceased.

The Tulameen district of British Columbia was visited in 1910 by Mr. Charles Camsell of the Geological Survey, who reports that "A few Chinese miners were again placer mining on a part of the bed of the Tulameen river between the mouths of Eagle and Champion creeks. This particular portion of the stream bed has been worked over a great many times since the first discovery of gold on it. Within the last twelve years it has been mined at least eight times, and the old cabins, gravel dumps, and abandoned machinery, show that it had already been worked over years before. Gold and platinum are obtained here in about equal proportions. The evidence suggests that the gold and platinum on the stream bed are replenished annually from some nearby source. What this source is, has not yet been determined. There are no prominent gravel deposits directly above this point, but it is significant that it lies immediately below a sheared and broken zone formed in the bed-rock, on the contact of pyroxenite with green schists. The method of working is to divert the water by wing dams to one side of the stream bed, and mine the other by sluicing. The amount of gold and platinum actually recovered was not ascertained, but it appears to have been satisfactory to the miners."

### Annual Production of Platinum.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1887.....	5,600	1894.....	950	1901.....	457
1888.....	6,000	1895.....	3,800	1902.....	46,502
1889.....	3,500	1896.....	750	1903.....	33,345
1890.....	4,500	1897.....	1,600	1904.....	10,872
1891.....	10,000	1898.....	1,500	1905.....	500
1892.....	3,500	1899.....	825	1906.....	*
1893.....	1,800	1900.....	Nil.		

\* See under Palladium.

## Annual Production of Palladium.

	Ozs.	Value.
1902 Palladium.....	4,411	\$86,014
1903 ".....	3,177	61,952
1904 ".....	952	18,564
1905 Metals of the platinum group.....	1,562	28,116
1906 ".....	314	5,652
1907-1910.....	* Nil	Nil.

\*Ontario Bureau of Mines Report, 1910.

## Imports of Platinum.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1883.....	113	1893.....	14,082	1903.....	21,251
1884.....	576	1894.....	7,151	1904.....	28,112
1885.....	792	1895.....	3,937	1905.....	61,719
1886.....	1,154	1896.....	6,185	1906.....	54,494
1887.....	1,422	1897.....	9,031	1907 (9 mos.).....	113,485
1888.....	13,475	1898.....	9,781	1908.....	60,390
1889.....	3,167	1899.....	9,671	1909.....	45,534
1890.....	5,215	1900.....	57,910	1910.....	84,435
1891.....	4,055	1901.....	20,263	1911*.....	137,241
1892.....	1,952	1902.....	19,357	.....	.....

\* Platinum wire and platinum in bars, strips, sheets or plates; platinum retorts, pans, condensers, tubing and pipe, imported by manufacturers of sulphuric acid for use in their works; crucibles. Duty free.

## TIN.

Tin ores have not yet been found in sufficient quantities in Canada to be of economic importance.

The occurrence of tin ore has been reported from several localities, the most important, perhaps, being the recent discovery of cassiterite, near New Ross, Lunenburg county, Nova Scotia. This occurrence has not yet been found of economic value. It has been visited by several officers of the Geological Survey, and reports upon it may be found in the Summary Report of the Geological Survey Branch, of the Department of Mines, for 1907, pages 77, and 80 to 83, and in the report for 1908, page 154.

In further reference to the New Ross occurrences, Mr. Faribault, in his summary report for 1910, states that: "At New Ross, Lunenburg county, some distance east of the district surveyed last summer, two important veins, one bearing manganese and the other tin and copper, were opened last summer.

"A tin-bearing vein, also recently discovered by Ernest Turner, at Mill Road, four miles north of New Ross, has been prospected under the management of A. L. McCallum. It has been proved to a depth of 20 feet, and for a length of 250 feet, while the float has been traced half a mile towards the north. The vein is 24 inches wide, mostly made up of quartz, merging with granite at the sides, and carries at the middle a streak of rich ore from three to five inches wide. Several assays of the ore made by Mr. McCallum have given from 10 to 30 per cent tin, and 8 per cent copper, present in the form of cassiterite and chalcopyrite, with association of tungsten-bearing zinc minerals."

The imports of tin and manufactures thereof into Canada are shown in the following table:—



## Imports of Tin and Tinware.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	281,880	1891.....	1,206,918	1902.....	2,293,958
1881.....	413,924	1892.....	1,594,205	1903.....	2,712,186
1882.....	790,285	1893.....	1,242,994	1904.....	2,389,557
1883.....	1,274,150	1894.....	1,310,389	1905.....	2,791,757
1884.....	1,018,493	1895.....	973,397	1906.....	3,336,948
1885.....	1,060,883	1896.....	1,237,684	1907 (9 mos.).....	2,719,813
1886.....	1,117,368	1897.....	1,274,108	1908.....	4,059,281
1887.....	1,187,312	1898.....	1,550,851	1909.....	2,985,361
1888.....	1,164,273	1899.....	1,372,813	1810.....	3,822,443
1889.....	1,243,794	1900.....	2,418,455	1911.....	4,647,784
1890.....	1,289,756	1901.....	2,339,109		

	Duty	Lbs.	\$
1911 { Tin crystals.....	Free.		4,933
{ Tin in blocks, pig, and bars.....	"	3,570,600	1,242,436
{ Tin plates and sheets.....	"	88,050,400	2,859,611
{ Tin foil.....	"	1,013,763	133,753
{ Tinware, plain, japanned or lithographed, and all manufactures of tin, N.E.S. ....	25% Free.		407,003
{ Tin strip waste.....		8,000	48
Total.....			4,647,784

## TUNGSTEN.

Reference was made in the report for 1908 to the discovery of scheelite in Halifax county, Nova Scotia. Mr. Faribault of the Geological Survey visited this deposit again in 1909, and a preliminary report thereon will be found in the Summary Report of the Geological Survey for 1909, pages 228-234. During 1910 these deposits were being developed by the Scheelite Mines Company, who are reported to have obtained very satisfactory results. In his summary report for 1910, Mr. Faribault refers to a new discovery in Queens county, as follows: "A new discovery of tungsten ore, in the form of scheelite has been made by A. N. Prest, at Middlefield, Queens county, near the Fifteen-mile Brook gold mine, and prospecting was started last fall in order to trace the float to the parent vein."

During 1911, the Scheelite Mines, Ltd., continued development work and erected a mill.

The occurrence of wolframite has also been noted in association with molybdenite by Dr. Walker in New Brunswick, near the confluence of Burnt Hill brook and the Southwest Miramichi. The property is being tested by Mr. Freeze of Doaktown, N.B., and Mr. Matthew Lodge of Moncton, who are interested therein.

# NON-METALLIC PRODUCTS.

## ABRASIVE MATERIALS.

The abrasives produced in Canada comprise corundum, the various sandstone abrasives, such as grindstones, pulpstones, whetstones, etc., and tripolite or infusorial earth.

### CORUNDUM.

The total shipments of grain corundum from operating mills in 1911, were 2,943,150 pounds, valued at \$161,873, as compared with shipments in 1910 of 3,740,900 pounds, valued at \$198,680. Of the shipments in 1911, 184,000 pounds, or 6 per cent of the total, were sold for consumption in Canada, and 2,759,150 pounds or 94 per cent, were sold for export.

The quantity of rock milled in 1911 was 41,795 tons, from which 3,281,750 pounds of grain corundum were graded, showing a recovery of 3.93 per cent of corundum from the rock. In 1910, 37,183 tons of rock were milled with a recovery of 3,372,800 pounds or 4.5 per cent of grain corundum.

The annual production since 1900 is shown in Table 1 below.

ABRASIVE MATERIALS.—TABLE 1.

Production of Corundum Ore and Corundum.

Cal- endar Year.	Corundum- bearing rock treated.	Grain corundum graded.	Grain corundum sold in Canada.	Grain corundum exported.	Total of grain corundum.	Value.	Average price.
	Tons.	Tons.	Tons.	Tons.	Tons.	\$	Cts.
1900..	.....	60	3	.....	3	300	5.00
1901..	4,134	444	85	302	387	46,415	5.97
1902..	7,996	806	106	662	768	84,465	5.49
1903.. (a)	8,877	839	85	618	703	77,510	5.51
1904..	23,187	1,654	116	877	993	109,545	5.51
1905..	23,571	1,681	140	1,504	1,644	149,153	4.48
1906..	45,719	2,914	162	2,112	2,274	204,973	4.50
1907..	60,532	2,682	164	1,728	1,892	177,922	4.70
1908..	2,678	106	99	990	1,089	100,398	4.60
1909..	35,894	1,579	129	1,362	1,491	162,492	5.45
1910..	37,183	1,686	106	1,764	1,870	198,680	5.31
1911..	41,795	1,641	92	1,380	1,472	161,873	5.50

(a) In addition to this amount which was milled in Canada, 267 tons of ore were mined and shipped to the United States for treatment there.

Corundum is found in Faraday, Dungannon, Monteagle, Carlow, Raglan, and adjacent townships, the operating mines being located in the last two. Mining operations have been in progress since 1900. In the earlier years of the industry, the amount of grain corundum graded averaged about 10 per cent of the rock treated. In more recent years, however, a much lower grade of rock

has been milled, the recovery of corundum in 1911 averaging about 3.926 per cent, in 1910 averaging about 4.5 per cent, and in 1909, 4.4 per cent of the rock treated.

The Manufacturers Corundum Company, Limited, is the only operator at present, working the Craig mine at Craigmont, Renfrew county, and the Burgess mines in Hastings county.

During the year the Company did some development work near Burgess mines and is now taking ore from one of these properties.

The treatment of the ore consists in concentration, magnetic separation of the iron, air separation of mica, and sizing. The magnetic sand is now being sold as a by-product and is used in the manufacture of school blackboards.

The corundum finds a market in Canada, the United States, England, France, Germany, and Belgium. Descriptions of mines and mills will be found in the Annual Report of the Ontario Bureau of Mines, and in Memoir No. 6, Geological Survey Publications.<sup>1</sup>

### **GRINDSTONES, PULPSTONES, ETC.**

The manufacture of grindstones is an industry which has been carried on for many years in the Provinces of Nova Scotia and New Brunswick. The output to-day is no greater than it was twenty years ago, and there has been comparatively little variation from year to year. The total production including wood pulpstones, etc., in 1911, was 4,566 tons, valued at \$52,942, as compared with 3,973 tons, valued at \$47,196, in 1910, and 4,275 tons, valued at \$54,664, in 1909.

These abrasives are quarried from the Millstone Grit of the Carboniferous formation, which occupies a large portion of the surface of the eastern half of the Province of New Brunswick and the northern and northwestern parts of Nova Scotia.

The localities at which quarrying operations are chiefly carried on are at Lower Cove, and Quarry island, near Merigomish, in Nova Scotia, and in New Brunswick on Chaleur bay, and at Woodpoint and Rockport on the Bay of Fundy.

The grindstones are all shipped in a finished condition, and are worth from \$10 to \$12 per ton.

About 160 tons of pulpstones, valued at \$3,960, were shipped in 1911, to Canadian pulp and paper mills. These stones weigh about 2½ tons each, and are usually made about 27" face by 54" diameter. About 54 tons of scythe stones, put up in one-quarter gross boxes, thirty pounds to the box, were sold at a value of \$2,000. A small quantity of "marble polishing grit" or a fine sandstone used for the polishing of marble was also sold. At some of the quarries there is a considerable production of foundation and building stone, besides rough stone for breakwater and harbour works.

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<sup>1</sup>The geology of the Haliburton and Bancroft areas, Province of Ontario, by Frank D. Adams and Alfred E. Barlow.

Most of the pulpstones are made at Quarryville, New Brunswick, by the Miramichi Quarry Company. This quarry also produces an excellent building stone, which finds a market in Quebec, Montreal, and Toronto.

Statistics of the production of grindstones by provinces since 1886 are given in Table 2.

# ABRASIVE MATERIALS. —TABLE 2.

## Annual Production of Grindstones.

Calendar Year.	NOVA SCOTIA.		NEW BRUNSWICK.		TOTAL.		Average value per ton.
	Tons.	Value.	Tons.	Value.	Tons.	Value.	
		\$		\$		\$	\$
1886	1,765	24,050	2,255	22,495	4,020	46,545	11 58
1887	1,710	25,020	3,582	38,988	5,292	64,008	12 10
1888	1,971	20,400	3,793	30,729	5,764	51,129	8 87
1889	712	7,128	2,692	23,735	3,404	30,863	9 07
1890	850	8,536	4,034	33,804	4,884	42,340	8 67
1891	1,980	19,800	2,499	22,787	4,479	42,587	9 51
1892	2,462	27,610	2,821	23,577	5,283	51,187	9 69
1893	2,112	21,000	2,488	17,379	4,600	38,379	8 34
1894	2,128	16,000	1,629	16,717	3,757	32,717	8 71
1895	1,400	14,000	2,075	17,932	3,475	31,932	9 19
1896	1,450	14,500	2,263	18,810	3,713	33,310	8 97
1897	1,407	17,500	3,165	24,840	4,572	42,340	9 26
1898	1,422	12,350	3,513	32,425	4,935	44,775	9 07
1899	1,378	10,300	3,133	32,965	4,511	43,265	9 59
1900	1,411	12,600	4,128	40,850	5,539	53,450	9 65
1901	358	3,200	4,223	42,490	4,581	45,690	9 97
1902	1,074	8,118	3,559	36,000	4,633	44,118	9 52
1903	1,337	9,562	4,201	38,740	5,538	48,302	8 72
1904	1,029	7,332	3,620	35,450	4,649	42,782	9 20
1905	1,020	10,200	4,520	52,175	5,540	62,375	11 25
1906	1,023	9,680	4,340	50,134	5,363	59,814	11 15
1907	551	4,480	4,863	55,896	5,414	60,376	11 15
1908	473	4,803	3,370	43,325	3,843	48,128	12 52
1909	312	3,204	3,963	51,460	4,275	54,664	12 79
1910	387	3,496	3,586	43,700	3,973	47,196	11 88
1911	380	3,382	4,186	49,560	4,566	52,942	11 59

The imports of grindstones into Canada, principally into the Provinces of Ontario and Quebec, reached a total value during the calendar year 1911, of \$123,356; the value of the other abrasives imported during the same period includes: burrstones, valued at \$1,642; emery, \$46,274; manufactures of emery, \$104,170; pumice stone, \$18,779; sandpaper, \$164,474; iron sand for glass or granite polishing or for paving stone, \$8,340; a total value of \$467,035.

In 1910 the value of grindstones imported was \$71,394, and the value of the other abrasives imported during the same period included: burrstones, valued at \$854; emery, \$40,400; manufactures of emery, \$92,890; pumice stone, \$14,829; sandpaper, \$148,384; iron sand for glass or granite polishing or for paving stone, \$6,647; a total value of \$375,398.



## ABRASIVE MATERIALS.—TABLE 3.

## Exports of Grindstones.\*

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1884.....	28,186	1894.....	12,579	1903.....	27,659
1885.....	22,606	1895.....	16,723	1904.....	35,612
1886.....	24,185	1896.....	19,139	1905.....	24,868
1887.....	28,769	1897.....	18,807	1906.....	31,978
1888.....	28,176	1898.....	25,588	1907.....	32,534
1889.....	29,982	1899.....	23,288	1908.....	19,721
1890.....	18,564	1900.....	42,128	1909.....	13,942
1891.....	28,433	1901.....	29,130	1910.....	23,502
1892.....	23,567	1902.....	24,489	1911.....	29,206
1893.....	21,672				

\* Including stone for the manufacture of grindstones.

## ABRASIVE MATERIALS.—TABLE 4.

## Imports.

Fiscal Year.	GRINDSTONES.		Burrstones.	Emery.	Mfrs. of	Pumice
	Tons.	Value.	(c) Value.	(a) Value.	emery. (b) Value.	stone. (d) Value.
		\$	\$	\$	\$	\$
1880.....	1,044	11,714	12,049	.....	.....	.....
1881.....	1,359	16,895	6,337	.....	.....	.....
1882.....	2,098	30,654	15,143	.....	.....	.....
1883.....	2,108	31,456	13,242	.....	.....	.....
1884.....	2,074	30,471	5,365	.....	.....	.....
1885.....	1,148	16,065	4,517	5,066	4,920	9,384
1886.....	964	12,803	4,062	11,877	5,832	2,777
1887.....	1,309	14,815	3,545	12,023	4,598	3,594
1888.....	1,721	18,263	4,753	15,674	4,001	2,890
1889.....	2,116	25,564	5,465	13,565	3,948	3,232
1890.....	1,567	20,569	2,506	16,922	5,313	3,003
1891.....	1,381	16,991	2,089	16,179	6,665	3,696
1892.....	1,484	19,761	1,464	17,782	6,492	3,282
1893.....	1,682	20,987	3,552	17,762	5,606	3,798
1894.....	1,918	24,426	3,029	14,433	2,223	4,160
1895.....	1,770	22,834	2,172	14,569	7,775	3,609
1896.....	1,862	26,561	2,049	16,287	11,913	3,721
1897.....	1,521	25,547	1,827	16,318	11,231	2,903
1898.....	.....	22,217	1,813	17,661	15,478	3,829
1899.....	.....	27,476	1,759	21,454	22,343	5,973
1900.....	.....	34,382	1,546	19,312	25,615	5,604
1901.....	.....	39,068	5,762	16,311	22,190	5,516
1902.....	.....	40,838	2,569	14,476	23,892	7,254
1903.....	.....	53,388	586	18,058	22,177	6,152
1904.....	.....	46,039	35	21,626	29,273	6,557
1905.....	.....	49,747	2,607	21,980	33,250	8,447
1906.....	.....	59,627	2,661	21,781	42,080	9,053
1907 (9 mos.).....	.....	40,780	245	20,498	41,086	5,745
1908.....	.....	65,125	3,396	26,159	57,760	8,917
1909.....	.....	56,692	1,141	25,931	47,700	8,117
1910.....	.....	73,427	1,973	28,482	73,537	12,011
1911.....	.....	64,439	880	42,188	95,982	16,284

(a) Emery in bulk, crushed or ground. Duty free.

(b) Emery and carborundum wheels and manufactures of emery or carborundum.

(c) Burrstones in blocks, rough or unmanufactured, not bound up or prepared by binding into millstones.

(d) Pumice and pumice stone, ground or unground. Duty free.

**TRIPOLITE.**

A small shipment of 20 tons of tripolite valued at \$122 was reported in 1911 from St. Anns, Cape Breton, by the Premier Tripolite Company of New York.

Statistics of shipments since 1896 are shown in Table 5.

## ABRASIVE MATERIALS.—TABLE 5.

**Annual Shipments of Tripolite.**

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1896.....	644	9,960	1904.....	320	6,400
1897.....	15	150	1905.....	200	3,600
1898.....	1,017	16,660	1906.....	Nil.	Nil.
1899.....	1,000	15,000	1907.....	30	225
1900.....	336	1,950	1908.....	30	195
1901.....	850	15,300	1909.....	Nil.	Nil.
1902.....	1,052	16,470	1910.....	22	134
1903.....	835	16,700	1911.....	20	122

## ASBESTOS.

Asbestos is mined or quarried in Canada in the Province of Quebec only, from deposits in the Eastern Townships in the districts of Black Lake, Thetford, East Broughton, and Danville. Other occurrences of the mineral have been noted and some shipments were at one time made from the township of Denholm, Ottawa county, north of the city of Ottawa.

The asbestos deposits and the asbestos industries have been described in a special report published by the Mines Branch.<sup>1</sup>

For a number of years past the annual output of asbestos has exceeded the sales. In 1911, however, the sales have been greatly increased but at considerably reduced prices. Returns received for the year 1911 show a total output of 96,302 tons, as compared with 100,430 tons in 1910. The sales in 1911 are, however, reported as 101,393 tons valued at \$2,922,062, or an average of \$28.82 per ton, as compared with 77,508 tons valued at \$2,555,974, or an average of \$32.98 per ton, in 1910; an increase of 23,885 tons, or 30 per cent in quantity, but only \$366,088, or 14 per cent in total value. Stocks on hand December 31, 1911, are reported as 34,567 tons, valued at \$1,509,101, as compared with 41,903 tons, valued at \$1,943,846 on December 31, 1910; a decrease of 7,336 tons, or 17.5 per cent.

The average number of men employed in mines and mills during 1911 was 2,707, at a wage cost of \$1,231,896.

The total quantity of asbestos rock sent to mills is reported as 1,484,691 tons, which with a mill production of 91,237 tons, shows an average estimated recovery of about 6.14 per cent.

The following tabulated statement shows the output and sales during 1911 and the stock on hand at the end of the year.

—	OUTPUT.	SALES.			STOCK ON HAND DEC. 31	
	Tons.	Tons.	Value.	Per ton.	Tons.	Value.
Crude, No. 1 .....	1,467.9	1,301.4	\$ 342,855	\$ 263.45	1,256	\$ 327,508
" No. 2.....	3,594.5	3,562.7	402,107	112.87	3,222.7	404,198
Mill stock No. 1. ....	20,379	18,315	916,678	50.05	8,471	380,570
" No. 2.....	39,289	47,826	991,370	20.73	17,794	365,458
" No. 3.....	31,572	30,388	269,052	8.85	3,823	31,367
Total asbestos .....	96,302.4	101,393.1	2,922,062	28.82	34,566.7	1,509,101
Asbestic ....	... ..	26,021	21,046	0.81	.....	.....

In the absence of a uniform classification of asbestos of different grades the above subdivisions have been adopted purely on a valuation basis; crude No 1,

<sup>1</sup> "Chrysotile-Asbestos: Its Occurrence, Exploitation, Milling, and Uses," by Fritz Cirkel, Mines Branch, Dept. of Mines, Ottawa, 1910.

comprising material valued at \$200 and upwards, and crude No. 2, under \$200; mill stock No. 1 includes stock valued at from \$30 to \$100; No. 2, from \$15 to \$30; No. 3, under \$15.

Output, sales, and stocks, in 1910, were as follows:—

	OUTPUT.	SALES.			STOCK ON HAND DEC. 31.	
	Tons.	Tons.	Value.	Per ton.	Tons.	Value.
			\$	\$		\$
Crude, No. 1.....	2,181	1,817	471,675	259 58	1,702	446,675
" No. 2.....	3,268	1,923	192,833	100 28	3,219	440,571
Mill stock, No. 1.....	16,720	13,480	735,244	54 54	6,978	398,895
" No. 2.....	56,395	43,414	1,013,251	23 34	26,613	628,528
" No. 3.....	21,866	16,874	142,971	8 47	3,391	29,177
Total asbestos.....	100,430	77,508	2,555,974	32 98	41,903	1,943,846
Asbestic.....		24,707	17,629	0 71		

The shipments of crude asbestos and mill stock since 1903 are separately shown in Table 2. The record indicates that during the past nine years there has been but little variation in the quantity shipped as crude, the average price of which, however, nearly doubled between 1903 and 1908.

The shipments of mill stock on the other hand have been increased from 27,995 tons in 1903 to 96,529 tons in 1911, the average price per ton during that time having varied between the limits of \$19.79 and \$29.84.

ASBESTOS.—TABLE 2.

Annual Production of Crude and Mill Stock, 1903-11.

Calendar Year.	CRUDE.			MILL STOCK.		
	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
1903.....	3,134	361,867	115 46	27,995	554,021	19 79
1904.....	4,410	534,874	121 28	31,201	678,628	21 75
1905.....	3,767	472,859	125 53	46,902	1,013,500	21 61
1906.....	3,841	635,345	165 41	56,920	1,401,083	24 61
1907.....	4,327	830,632	191 97	57,803	1,654,135	28 62
1908.....	3,345 5	669,232	200 04	63,202	1,886,129	29 84
1909.....	3,074 3	575,510	187 20	60,275	1,709,077	28 35
1910.....	3,740	664,508	177 66	73,768	1,891,466	25 64
1911.....	4,864 1	744,962	153 15	96,529	2,177,100	22 55

Table 3 shows the total shipments of asbestos and asbestic separately, each year since 1880.

ASBESTOS.—TABLE 3.  
Annual Production since 1880.

Calendar Year	ASBESTOS.			ASBESTIC.		
	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
1880 (a).....	380	24,700	65 00			
1881 (a).....	540	35,100	65 00			
1882 (a).....	810	52,650	65 00			
1883 (a).....	955	68,750	71 99			
1884 (a).....	1,141	75,097	65 82			
1885 (a).....	2,440	142,441	58 38			
1886 (a).....	3,458	206,251	59 64			
1887.....	4,619	226,976	48 92			
1888.....	4,404	255,007	57 90			
1889.....	6,113	426,554	69 78			
1890.....	9,860	1,260,240	127 81			
1891.....	9,279	999,878	107 76			
1892.....	6,082	390,462	64 20			
1893.....	6,331	310,156	86 81			
1894.....	7,630	420,825	55 15			
1895.....	8,753	368,175	42 05			
1896.....	10,892	423,066	38 84	1,358	6,790	5 00
1897.....	13,202	399,528	29 99	17,240	45,840	2 66
1898.....	16,124	475,131	29 47	7,661	16,066	2 10
1899.....	17,790	468,635	26 34	7,746	17,214	2 22
1900.....	21,621	729,886	33 76	7,520	18,545	2 47
1901.....	32,892	1,248,645	37 96	7,325	11,114	1 52
1902.....	30,219	1,126,688	37 28	10,197	21,631	2 20
1903.....	31,129	915,888	29 42	10,548	13,869	1 31
1904.....	35,611	1,213,502	34 08	12,854	12,856	1 00
1905.....	50,669	1,486,359	29 33	17,594	16,900	0 96
1906.....	60,761	2,036,428	33 52	21,424	23,715	1 11
1907.....	62,130	2,484,767	39 99	28,296	20,275	0 72
1908.....	66,548	2,555,361	38 40	24,225	17,974	0 74
1909.....	63,349	2,284,587	36 06	23,951	17,188	0 72
1910.....	77,508	2,555,974	32 98	24,707	17,629	0 71
1911.....	101,393	2,922,062	28 82	26,021	21,046	0 81

(a) Figures of export taken as production.

### EXPORTS AND IMPORTS.

Supplying as it does, the greater part of the world's demand, the Canadian output of asbestos finds a wide distribution.

Exports to Great Britain, United States, Germany, and other countries during the past seven calendar years, as compiled from the reports of the Customs Department, are shown in Table 4, and the total exports each year since 1892 in Table 5.

Attention has been called to the fact that these figures apparently do not accurately indicate the destination of exports, that Germany, for instance, is a much larger consumer of Canadian asbestos than is shown by these figures. This may possibly be explained by the fact that frequently raw materials of this kind are sold in bond to brokers or dealers in New York, and by them resold to consumers in other countries.

The exports in 1911 are reported as 75,120 tons, valued at \$2,067,259, or an average of \$27.52 per ton, and include 7,511 tons valued at \$192,993 exported to



Great Britain, 62,551 tons valued at \$1,732,541 to the United States, 361 tons valued at \$20,494 to Germany, 1,841 tons valued at \$62,737 to Belgium, 2,596 tons valued at \$52,047 to France, and 260 tons valued at \$6,447 to other countries.

ASBESTOS.—TABLE 4.

## Exports of Canadian Asbestos by Countries, 1903-1911.

Calendar Year.	TO GREAT BRITAIN.		TO UNITED STATES.		TO GERMANY.		TO OTHER COUNTRIES.		TOTAL EXPORTS.		Average per ton.
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	
		\$		\$		\$		\$		\$	
1903	2,743	40,120	24,252	714,781	1,429	25,150	3,356	110,982	31,780	891,033	28 04
1904	6,602	210,175	25,957	762,300	2,463	94,141	2,250	94,271	37,272	1,160,887	31 15
1905	9,731	305,056	29,696	811,080	2,969	100,061	4,635	169,918	47,031	1,386,115	29 47
1906	9,435	318,313	39,767	1,058,513	3,654	82,117	6,998	230,314	59,854	1,689,257	28 22
1907	5,432	200,909	44,861	1,312,582	225	8,195	6,235	147,613	56,753	1,669,299	29 41
1908	5,221	288,290	50,503	1,314,337	341	9,470	5,145	230,666	61,210	1,842,763	30 11
1909	5,227	204,978	45,675	1,243,755	693	17,706	5,376	263,378	56,971	1,729,857	30 36
1910	6,700	280,452	57,939	1,505,477	440	15,925	6,406	306,778	71,485	2,108,632	29 50
1911	7,511	192,993	62,551	1,732,541	361	20,494	4,697	121,231	75,120	2,067,259	27 52

ASBESTOS.—TABLE 5.

## Annual Exports, Calendar Years 1892-1911.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
		\$	\$ cts.			\$	\$ cts.
1892. ....	5,380	373,103	69 35	1902. ....	31,074	995,071	32 02
1893. ....	5,917	338,707	57 24	1903. ....	31,780	891,033	28 04
1894. ....	7,987	477,837	59 82	1904. ....	37,272	1,160,887	31 14
1895. ....	7,442	421,690	56 66	1905. ....	47,031	1,386,115	29 47
1896. ....	11,842	567,967	47 96	1906. ....	59,854	1,689,257	28 22
1897. ....	15,570	473,274	30 40	1907. ....	56,753	1,669,299	29 41
1898. ....	15,346	494,012	32 19	1908. ....	61,210	1,842,763	30 11
1899. ....	17,883	473,148	26 46	1909. ....	56,971	1,729,857	30 36
1900. ....	16,993	693,105	39 61	1910. ....	71,485	2,108,632	29 50
1901. ....	32,269	1,069,918	33 16	1911. ....	75,120	2,067,259	27 52

Although the chief source for the raw material, Canada does not yet manufacture all the asbestos goods required for home consumption. There is, therefore, a considerable importation of asbestos goods under the import classification, 'Asbestos in any form other than crude and all manufactures of,' the duty being 25 per cent.

The total value of these imports during the calendar year 1911 was \$319,815, as against \$230,489 in 1910, and \$196,742 in 1909.

The annual value of the imports during the fiscal year is shown in Table 6.

## ASBESTOS.—TABLE 6.

## Imports, Fiscal Years 1885-1911.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1885.....	674	1894.....	20,021	1903.....	75,465
1886.....	6,831	1895.....	26,094	1904.....	83,827
1887.....	7,836	1896.....	23,900	1905.....	116,836
1888.....	8,793	1897.....	19,032	1906.....	137,974
1889.....	9,943	1898.....	26,389	1907 (9 mos.).....	127,509
1890.....	13,250	1899.....	32,607	1908.....	190,980
1891.....	13,298	1900.....	43,455	1909.....	180,598
1892.....	14,090	1901.....	50,829	1910.....	198,710
1893.....	19,181	1902.....	52,464	1911*.....	254,331

\* Asbestos in any form other than crude, and all manufactures of. Duty 25 per cent.

The imports of asbestos into the United Kingdom will be of interest, as indicating the possible market in that country for this product.

These imports and the sources of supply, are shown as follows:—

## Imports of Raw Asbestos into the United Kingdom, 1909, 1910, and 1911.

Country.	1909.		1910.		1911.	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
		\$		\$		\$
Russia.....	599	71,063	961	119,267	1,548	202,049
Germany.....	351	48,681	354	62,011	198	26,888
Portuguese East Africa.....	324	56,526	260	35,016	300	23,988
Italy.....	215	38,369	167	21,379	53	7,042
United States.....	1,549	40,549	1,097	35,814	565	17,948
Other foreign countries.....	167	12,410	82	7,086	123	14,036
Total foreign.....	3,205	267,598	2,921	280,573	2,787	291,951
Cape of Good Hope.....	424	30,519	747	54,000	1,187	83,307
Natal.....	78	9,247	56	7,091	67	4,395
Canada.....	2,727	144,691	4,347	210,873	3,683	169,589
Other British possessions.....	43	5,596	14	1,762	2	34
Total British possessions....	3,272	190,053	5,164	273,726	4,939	257,325
Grand total.....	6,477	457,651	8,085	554,299	7,726	549,276

The following is a list of the principal asbestos companies in Canada:—

Name of operator.	Location of mine.	Address.
Amalgamated Asbestos Corporation, Ltd.....	Coleraine, Thetford...	Montreal, 263 St. James St.
Black Lake Consolidated Asbestos Co.....	" " ..	Black Lake, Que.
The Beaver Asbestos Co., Ltd.....	" Megantic ..	Walkerville, Ont.
Johnston's Asbestos Co., Ltd.....	Thetford, Black Lake..	Thetford Mines, Que.
Bell Asbestos mine.....	" " ..	" "
Robertson Asbestos Mining Co.....	" " ..	" "
Jacob's Asbestos Mining Co., Ltd.....	" " ..	Montreal, 282 St. Catherine St. W.
The Martin-Bennett Asbestos Mines, Ltd.....	" " ..	Thetford Mines, Que.
The B & A Asbestos Co.....	" " ..	Robertsonville, Que.
The Berlin Asbestos Co.....	" " ..	Robertson Sta., Que.
The Asbestos & Asbestic Co., Ltd.....	Shipton .....	Asbestos, Que.
Broughton Asbestos Fibre Co.....	Broughton .....	East Broughton Sta., Que.
Eastern Townships Asbestos Co.....	" .....	" "
Boston Asbestos Co., Ltd. (In liquidation)....	" .....	" "
The Ling Asbestos Co. (In liquidation).....	" .....	" "
The Frontenac Asbestos Mining Co., Ltd. (In mortgagees hands) ..	" .....	Quebec, 81 St. Peter St.
Montreal Asbestos Co., Ltd. (In liquidation)...	Broughton East.....	Montreal, 171 St. James St.
Brompton Lake Asbestos Co .....	Brompton Lake.....	Montreal, 17 Victoria Sq.
W. H. Lambly.....	.....	Inverness, Que.
Belmina Consolidated Asbestos Co., Ltd .....	Wolfestown.....	Coleraine Sta., Que.

## CHROMITE.

Chromic iron ore is mined in the Coleraine and Black Lake districts of the Eastern Townships, Province of Quebec.

The total shipments of chromite in 1911 were reported as 157 tons, valued at \$2,587, and included 137 tons of high grade product, valued at \$2,327, or \$16.98 per ton, and 20 tons of low grade, valued at \$260, or \$13 per ton.

The greater part of the shipments were made by the Dominion Chrome Co. from stock piles, this Company not having operated their mines during the year. The Chrome and Asbestos Mines, Ltd., were engaged on the completion of a concentrating mill and made only small shipments, but expect to start more active work in 1912.

Statistics of production since 1886 are shown in Table 1, following, the total during the last seven years being divided into high and low grade. Material classed as high grade includes both ore and concentrates, ranging from 48 per cent to 50 per cent  $\text{Cr}_2\text{O}_3$  and higher, while the low grade is composed chiefly of the crude ore.

CHROMITE.—TABLE 1.  
Annual Production in Canada, 1886-1911.

Calendar Year.	HIGH GRADE.			LOW GRADE.			TOTAL.		
	Short tons.	Value.	Average price.	Short tons.	Value.	Average price.	Short tons.	Value.	Average price.
		\$	\$ cts.		\$	\$ cts.		\$	\$ cts.
1886							60	945	15 75
1887							38	570	15 00
1888 to							No output.		
1893									
1894									
1895									
1896							1,000	20,000	20 00
1897							3,177	41,300	13 00
1898							2,342	27,004	11 53
1899							2,637	32,474	12 31
1900							2,021	24,252	12 00
1901							2,010	21,842	10 86
1902							2,335	27,000	11 56
1903							1,274	16,744	13 14
1904							900	13,000	14 44
1905							3,509	51,129	14 57
1906	2,842	44,280	15 58	667	6,849	10 27	6,074	67,146	11 05
1907	4,650	53,976	16 08	1,424	13,170	9 25	8,575	93,301	10 88
1908				8,575	93,301	10 88	9,035	91,859	10 17
1909	4,975	57,484	11 55	4,060	34,375	8 47	7,196	72,901	10 13
1910	3,545	41,931	11 83	3,651	30,970	8 48	7,225	82,008	11 35
1911	3,472	45,300	13 05	3,753	36,708	9 78	2,470	26,604	10 77
	54	720	13 33	2,416	25,884	10 71	299	3,734	12 49
	25	430	17 20	274	3,304	12 06	157	2,587	16 48
	137	2,327	16 98	20	260	13 00			

The chromite finds its chief market in the United States, although a few carloads are occasionally shipped to Canadian points.

There were no exports reported during the calendar year 1911, as against exports of 15 tons, valued at \$150, in 1910.

The following table shows the quantity and value of Canadian chromite imported into the United States during the past eight years.

Imports of Chromite into the United States from Canada.<sup>1</sup>

Twelve months ending June 30.	Short tons.	Value.	Twelve months ending June 30.	Short tons.	Value.
		\$			\$
1904.. .. .	2,790	36,322	1908.....	6,505	69,009
1905.....	6,489	70,934	1909.....	4,455	50,042
1906.....	9,951	107,580	1910.....	269	2,892
1907.....	6,179	66,115	1911.....	17	150

<sup>1</sup>The Foreign Commerce and Navigation of the United States, Washington, long ton in original changed to short ton.

Chrome ore is used chiefly for the manufacture of ferro-chrome alloys and chromium salts for pigments, and is also used for linings in steel and copper furnaces.

Prices in New York, during 1911, of New Caledonia ore, carrying 50 per cent chromic oxide, ranged from \$14 to \$16 per long ton. The price of chrome oxides at Pittsburgh was \$175 per thousand throughout the year.

The price of potassium bichromate ranged between 7 and 8 cents per pound during the year, while the price of sodium bichromate varied from 5 to 6½ cents per pound.

As an illustration of the market for chromite in the United States, the imports into that country during the past two years are shown in the following table. The average value of these imports shows an increase of over 70 cents per ton in 1911, as compared with 1910.



## CHROMITE.—TABLE 2.

Imports into the United States, years ending June 30, 1910 and 1911, in tons of 2,240 lbs.<sup>1</sup>

	1910.			1911.		
	Long tons.	Value.	Per ton.	Long tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
Belgium.....	3,558	49,720	13 97			
Canada.....	241	2,892	12 00	15	150	10 00
France.....				3,400	41,365	12 17
French Oceania....	9,466	89,521	9 46	8,957	114,239	12 75
Greece.....	7,740	68,126	8 80	4,500	48,188	10 71
India.....	231	466	2 02			
Japan.....	2,290	16,959	7 40	449	3,680	8 20
Netherlands.....	125	2,110	16 88			
Portuguese Africa..	19,455	236,691	12 17	16,318	198,538	12 17
Turkey in Asia....	1,100	7,000	6 36	4,500	31,121	6 92
United Kingdom..	747	9,038	12 10			
Total.....	44,953	482,523	10 73	38,139	437,281	11 47

<sup>1</sup> The Foreign Commerce and Navigation of the United States, 1909-19

## COAL.

Coal mining both from the point of view of tonnage handled and gross value of output is the most important of Canada's mining industries. The character of coal mined is chiefly bituminous, although anthracite is obtained from one mine in Alberta and a considerable tonnage of lignite is mined in Alberta and Saskatchewan. The total production for all classes in 1911 was, according to returns received, 11,323,388 short tons, as compared with a production of 12,909,152 tons in 1910 and 10,501,475 tons in 1909, the falling off in 1911 as compared with 1910 being 1,585,764 tons or about 12 per cent. The total approximate selling value of the coal at the mines in 1911 was \$26,467,646 or an average of \$2.34 per ton, as compared with a total value of \$30,909,779 or an average of \$2.39 per ton in 1910.

The coal mining industry in Canada has had a fairly steady growth in past years, and the decreased production in 1911 was due entirely to the unfortunate labour troubles which resulted in the closing down from April 1 to November 20 of about 16 important mines in the southern part of Alberta and the eastern part of British Columbia. About 6,000 men ceased work and there was practically no coal mined in the districts affected for a period of nearly eight months. The production by these sixteen companies during the period they were in operation in 1911 was only 1,219,178 tons, as against 3,874,355 tons produced by the same mines in 1910, showing a direct falling off, attributable to the strike, of at least 2,655,177 tons. In fact, if the probable increase of production of these mines under ordinary operating conditions be assumed, it is safe to say that the coal production in 1911 might easily have been 3,000,000 tons in excess of that actually reported. Practically every coal mining district, other than those affected by the strike, showed an increased production in 1911.

With a view to relieving the threatened shortage of coal in the Provinces of Alberta and Saskatchewan, the Dominion Government passed an Order in Council remitting the duty on bituminous coal imported into Canada at the ports on the southern frontier of the Dominion west of Sault Ste. Marie for consumption in the Provinces of Manitoba, Saskatchewan, Alberta, and British Columbia, east of the 122nd meridian of longitude, such remission of duties to become effective on and after August 7. The remission of duties was discontinued on and after December 6. The imports of bituminous coal showed an increase during the year of 2,939,349 tons or nearly 50 per cent over the imports in 1910.

Statistics of the production by provinces during the past three years are shown in Table 1, and Table 2 shows the increases and decreases in each year as compared with the previous year.

It may be explained that the term production in these tables is used to represent the amount of coal actually sold or used by the producer, as distinguished from the term output which is applied to the total coal extracted from the mine and which in some cases includes coal lost or unsaleable or coal carried into stock on hand at the end of the year.

In the Province of Nova Scotia an increased production of 573,278 tons or about 9 per cent is shown in 1911, while a small increase is also shown in New Brunswick. The Province of Saskatchewan shows an increase of 25,623 tons or over 14 per cent. A falling off of over 47 per cent is shown in the Alberta production and of over 23 per cent in the production of British Columbia.

COAL.—TABLE 1.

Production by Provinces, 1909-10-11, in tons of 2,000 lbs.

Province.	1909.		1910.		1911.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
Nova Scotia.....	5,652,089	\$11,354,643	6,431,142	\$12,919,705	7,004,420	\$14,071,379
British Columbia..	2,606,127	8,144,147	3,330,745	10,403,580	2,542,532	7,945,413
Alberta.....	1,994,741	4,838,109	2,894,469	7,065,736	1,511,036	3,979,264
Saskatchewan.....	192,125	296,339	181,156	293,923	206,779	347,248
New Brunswick...	49,029	98,496	55,455	110,910	55,781	111,562
Yukon Territory...	7,364	49,502	16,185	110,925	2,840	12,780
Total.....	10,501,475	24,781,236	12,909,152	30,909,779	11,323,388	26,467,646

COAL.—TABLE 2.

Comparison of Production 1909 with 1910, and 1910 with 1911.

Province.	(i) INCREASE OR (d) DECREASE.			
	Years 1909 and 1910.		Years 1910 and 1911.	
	Tons.	Per cent.	Tons.	Per cent.
Nova Scotia .....	(i) 779,053	13.78	(i) 573,278	8.91
British Columbia.....	(i) 724,618	27.80	(d) 788,213	23.66
Alberta .....	(i) 899,728	45.11	(d) 1,383,433	47.79
Saskatchewan.....	(d) 10,969	5.71	(i) 25,623	14.14
New Brunswick .....	(i) 6,426	13.11	(i) 326	0.59
Yukon Territory .....	(i) 8,821	119.79	(d) 13,345	82.45
Total for Canada.....	(i) 2,407,677	22.93	(d) 1,585,764	12.28

The Province of Nova Scotia in 1911 produced 62 per cent of the total Canadian production; British Columbia 22 per cent; Alberta 13 per cent, and Saskatchewan a little under 2 per cent. The relative importance of the different provinces as coal producers for a number of years past is indicated in the next table, in which is shown the proportional contributions of each province to the total tonnage of coal produced in Canada. The coal fields on the Atlantic seaboard still continue to produce more than half the total, although in 1910 the combined output of the western provinces was only a little less than 50 per cent of the total.

Province.	1874.	1890.	1900.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.
	%	%	%	%	%	%	%	%	%	%	%	%	%
Nova Scotia.....	91	71	62.9	69.4	71.3	65.0	65.5	64.07	60.79	61.40	54.29	50.25	62.35
New Brunswick.....													
Saskatchewan*.....			0.7	0.9	1.5	1.5	1.2	1.11	1.44	1.37	1.83	1.40	1.83
Alberta*.....		4	5.4	5.4	6.2	8.0	10.8	12.77	15.14	15.42	18.99	22.42	13.34
British Columbia.....	8	25	31.0	24.2	21.0	22.5	22.4	21.98	22.50	21.77	24.82	258.0	22.45
Yukon Territory.....				0.1			0.1	0.07	0.13	0.04	0.07	0.13	0.03

\* Alberta and Saskatchewan were established as provinces on September 1, 1905. For the purpose of comparison, the coal production during the years previous to that date has been separated according to the present boundaries of these Provinces.

Of the total coal production in Canada during the past year, 8,559,952 tons were reported as sold for consumption in Canada, 1,068,572 tons sold for export to the United States, and 280,235 tons sold for export to other countries, or total sales 9,908,759 tons; 381,340 tons were used by colliery operators in making coke, and 1,033,289 tons were used for colliery purposes and by workmen. In addition to the coal thus disposed of, 42,709 tons were mined and added to stock at the end of the year and 182,567 tons reported as waste; these two items are not included as "Production," but bring the total output up to 11,548,664 tons.

Thus of the total output about 85.8 per cent was placed directly in the market, 3.3 per cent made into coke by the mine operators, 8.9 per cent used in colliery consumption for workmen, and 1.6 per cent reported as waste. The quantities entered as loss due to washing, breakage, etc., do not necessarily include all the losses due to these causes since many companies do not make any returns under this heading. Also the quantity entered as sold for consumption in Canada probably includes a small quantity which is ultimately exported.

Notwithstanding Canada's large coal resources, the total domestic production (including that exported) was equivalent in 1911 to only about 46.7 per cent of the total consumption, there having been imported for home consumption during 1911, 14,558,892 tons. The total consumption of coal as shown in subsequent tables was 24,247,698 tons, or an average of about 3.388 tons per capita, while the production averaged about 1.582 tons per capita of population. The principal coal-fields are located on the extreme east and in the far west, while



the central Provinces of Ontario and Quebec, which contain the great bulk of the population, are without coal deposits. Nova Scotia coal is largely consumed within the Province and also finds a considerable market in Quebec. A little less than 9 per cent of the coal production of this Province was reported as sold for export in 1911. The market in Ontario is almost altogether supplied, and that of Quebec province to a lesser degree, by coal imported from the nearer fields of the adjacent states of the United States. There are no anthracite coals in eastern Canada, and our requirements of this fuel have to be met entirely by imports from Pennsylvania. Manitoba is also supplied largely by importations from the United States.

The Saskatchewan production finds a local market within the Province and also in Manitoba.

Of the Alberta production about 93.2 per cent in 1911 was used by collieries and sold for consumption in Canada, chiefly within the Province; 2.7 per cent sold for export, and 4.1 per cent used for making coke which was marketed in British Columbia and in the United States. British Columbia is the largest producer of coal for export. In 1911 about 68.4 per cent of the production in this Province was used by the collieries and sold for home consumption; 27.0 per cent was sold for export, and 4.6 per cent used in making coke.

Owing to the greatly reduced output in Alberta and British Columbia in 1911, there was a very much smaller proportion of the output used for making coke or sold for exports.

The output by provinces showing the distribution of coal mined in 1910 and 1911 is given in the next two tables.

Coal Output in Canada 1910.

	Nova Scotia.	New Brunswick.	Saskatchewan.	Alberta.	Yukon.	British Columbia.	Total.
Sales in Canada .....	5,003,933	53,455	173,084	2,309,438	16,135	1,400,405	8,956,450
Sales for export to U. S. . .	356,089	.....	.....	243,371	.....	1,248,483	1,847,943
Sales for export to other countries.....	223,748	.....	.....	.....	.....	67,525	291,273
Total sales.....	5,583,770	53,455	173,084	2,552,809	16,135	2,716,413	11,095,666
Used by producers in making coke .....	183,560	.....	.....	196,250	.....	379,893	759,703
Used by producers for colliery consumption and workmen.....	663,812	2,000	8,072	145,410	50	234,439	1,053,783
Stock on hand Jan. 1.....	149,958	.....	.....	10,074	.....	39,987	200,019
" Dec. 31 ....	175,333	.....	.....	8,957	.....	79,376	263,666
Difference.....	+ 25,375	.....	.....	- 1,117	.....	+ 39,389	+ 63,647
Losses due to breakage or other causes .....	58,645	.....	10,010	14,724	.....	160,337	243,716
Total output*.....	6,515,162	55,455	191,166	2,908,076	16,185	3,530,471	13,216,515

\* Production is obtained by adding coal sold and coal used.



## Coal Output in Canada, 1911.

	Nova Scotia.	New Brunswick.	Saskatchewan.	Alberta.	Yukon.	British Columbia.	Total.
Sales in Canada.....	5,462,828	53,781	198,768	1,304,778	2,840	1,536,957	8,559,952
Sales for export to U. S. . .	385,095	.....	.....	40,723	.....	642,754	1,068,572
Sales for export to other countries. ....	236,609	.....	.....	161	.....	43,465	280,235
Total sales.....	6,084,532	53,781	198,768	1,345,662	2,840	2,223,176	9,908,759
Used by producers in making coke.....	273,548	.....	.....	61,591	.....	117,215	452,354
Used by producers for colliery consumption and workmen.....	646,340	2,000	8,011	103,783	.....	202,141	962,275
Stock on hand Jan. 1. ....	173,164	.....	.....	10,675	.....	81,207	265,046
" Dec. 31. ....	211,338	.....	.....	15,773	.....	80,644	307,755
Difference.....	+ 38,174	.....	.....	+ 5,098	.....	- 563	+ 42,709
Losses due to breakage or other causes.....	82,957	.....	10,414	49,796	.....	39,400	182,567
Total output ‡ ....	7,125,551	55,781	217,193	1,565,930	2,840	2,581,369	11,548,664

‡ Production is obtained by adding coal sold and coal used.

## Distribution of Coal mined in Canada during the Years 1907-8-9.

	1907.	1908.	1909.
Sales in Canada.....	7,358,135	7,715,203	7,468,880
Sales for export to United States.....	1,514,182	1,218,656	1,173,772
" " other countries .....	129,957	297,291	171,388
Total sales.....	9,002,274	9,231,150	8,814,040
Used by producers for the manufacture of coke.....	751,967	708,674	752,976
" " colliery consumption and workmen..	757,185	946,487	934,459
Stock on hand Jan. 1. ....	212,559	183,443	202,432
" Dec. 31. ....	190,224	230,335	219,569
Difference.....	- 22,335	+ 46,892	+ 17,137
Loss due to washing, breakage, or other causes.....	351,783	157,610	154,162
Total output.....	10,840,874	11,090,813	10,672,774

Statistics of the annual production of coal in Canada since 1784 are shown in Table 3. The total production from 1785 to 1911 has been 183,438,591 tons; of which 122,762,615 tons or 66.9 per cent are to be credited to Nova Scotia and 42,649,441 tons or 23.2 per cent to British Columbia.

The production during the ten years 1871-1880 inclusive was 11,380,416 tons; the following ten year period, 1881-1890, showed a total production of 22,001,394 tons. The production from 1891 to 1900 was 40,381,708 tons and from 1901 to 1910 it was 80,497,726 tons, each decennial period showing a production only a little less than twice that of the previous ten years.

## COAL.—TABLE 3.

Annual Production showing the Increase or Decrease each year.

Year.	Tons.	Value.	Average value per ton.	Increase (i) or decrease (d) in tonnage.	Increase (i) or decrease (d) per cent.
		\$	\$		
1785 to 1873 .....	*8,591,150				
1874 .....	1,063,742	1,763,423	1 66		
1875 .....	1,039,974	1,747,016	1 68	(d) 23,768	(d) 2.2
1876 .....	994,762	1,729,546	1 74	(d) 45,212	(d) 4.3
1877 .....	1,036,670	1,794,415	1 73	(i) 41,908	(i) 4.2
1878 .....	1,089,744	1,941,285	1 78	(i) 53,074	(i) 5.1
1879 .....	1,126,497	2,050,639	1 82	(i) 36,753	(i) 3.4
1880 .....	1,482,714	2,657,194	1 79	(i) 356,217	(i) 31.6
1881 .....	1,537,106	2,688,621	1 75	(i) 54,392	(i) 3.7
1882 .....	1,843,148	3,248,446	1 76	(i) 311,042	(i) 20.2
1883 .....	1,818,684	3,109,635	1 71	(d) 29,464	(d) 1.6
1884 .....	1,984,959	3,593,831	1 81	(i) 166,275	(i) 9.1
1885 .....	1,920,977	3,417,807	1 78	(d) 63,982	(d) 3.2
1886 .....	2,116,653	3,739,840	1 77	(i) 195,676	(i) 10.2
1887 .....	2,429,330	4,388,206	1 81	(i) 312,677	(i) 14.8
1888 .....	2,602,552	4,674,140	1 80	(i) 173,222	(i) 7.1
1889 .....	2,658,303	4,894,287	1 84	(i) 55,751	(i) 2.1
1890 .....	3,084,682	5,676,247	1 84	(i) 426,379	(i) 16.0
1891 .....	3,577,749	7,019,425	1 96	(i) 493,067	(i) 16.0
1892 .....	3,287,745	6,363,757	1 94	(d) 290,004	(d) 8.1
1893 .....	3,783,499	7,359,080	1 95	(i) 495,754	(i) 15.1
1894 .....	3,847,070	7,429,468	1 93	(i) 63,571	(i) 1.7
1895 .....	3,478,344	6,739,153	1 94	(d) 368,726	(d) 9.6
1896 .....	3,745,716	7,226,462	1 93	(i) 267,372	(i) 7.7
1897 .....	3,786,107	7,303,597	1 93	(i) 40,391	(i) 1.1
1898 .....	4,173,108	8,224,288	1 97	(i) 387,001	(i) 10.2
1899 .....	4,925,051	10,283,497	2 09	(i) 751,943	(i) 18.0
1900 .....	5,777,319	13,742,178	2 38	(i) 852,268	(i) 17.3
1901 .....	6,486,325	12,699,243	1 96	(i) 709,006	(i) 12.3
1902 .....	7,466,681	15,210,877	2 04	(i) 780,356	(i) 15.1
1903 .....	7,960,364	15,942,833	2 00	(i) 493,683	(i) 6.6
1904 .....	8,254,595	16,592,231	2 01	(i) 294,231	(i) 3.7
1905 .....	8,667,948	17,520,263	2 02	(i) 413,353	(i) 5.0
1906 .....	9,762,601	19,732,019	2 02	(i) 1,094,653	(i) 12.6
1907 .....	10,511,426	24,381,842	2 32	(i) 748,825	(i) 7.7
1908 .....	10,886,311	25,194,573	2 31	(i) 374,885	(i) 3.5
1909 .....	10,501,475	24,781,236	2 36	(d) 384,836	(d) 3.5
1910 .....	12,909,152	30,909,779	2 39	(i) 2,407,677	(i) 22.93
1911 .....	11,323,388	26,467,646	2 34	(d) 1,585,764	(d) 12.28

\* The total production for the years 1785 to 1873 is made up as follows :—

Nova Scotia (1785 to 1873) .....	8,053,670 tons of	2,000 pounds.
British Columbia (1836 to 1873) .....	537,480 "	2,000 "

## EXPORTS AND IMPORTS.

The statistics of exports and imports of coal as given in tables following have been compiled from the reports of the Department of Customs. The total exports during 1911 were 1,500,639 tons valued at \$4,357,074, or \$2.90 per ton, as compared with exports in 1910 of 2,377,049 tons valued at \$6,077,350, or \$2.56 per ton. A decrease in exports is, therefore, shown in 1911, of 876,410 tons, or about 36.8 per cent. The exports during 1911 are the smallest recorded since 1899.

The total imports during 1911 were 14,558,892 tons valued at \$39,292,591, as compared with imports in 1910 of 10,597,982 tons valued at \$28,450,001, showing an increase in imports of 3,960,910 tons or 37.4 per cent.

Statistics of exports during 1909-10-11 showing the principal countries of destination are given in Table 4, and annual exports since 1873 in Table 5.

COAL.—TABLE 4.

## Exports of Coal produced in Canada during 1909-10-11.

Exported to	1909.		1910.		1911.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
Great Britain.....	10,671	36,403	5,872	18,901	14,185	48,496
United States.....	1,240,519	3,357,111	1,947,287	4,583,626	1,035,889	2,809,204
Newfoundland.....	175,801	493,040	203,626	574,157	223,553	617,299
Other countries.....	161,108	569,788	220,264	900,666	227,012	882,075
Total.....	1,588,099	4,456,342	2,377,049	6,077,350	1,500,639	4,357,074

The United States is the principal market for Canadian coal exported, that country having taken about 69.1 per cent of the total exports in 1911. There were exported to Newfoundland 223,553 tons or 14.9 per cent of the total. Exports to other countries of 227,012 tons include 55,316 tons to Mexico and 46,926 tons to Australia. Considerable tonnages are also exported to Bermuda, St. Pierre, Cuba, Japan, and many other points.

COAL.—TABLE 5.

## Exports.

Calendar Year.	Produce of Canada.	Not the produce of Canada.	Calendar Year.	Produce of Canada.	Not the produce of Canada.
	Tons.	Tons.		Tons.	Tons.
1873.....	420,683	5,403	1893.....	960,312	102,827
1874.....	310,988	12,859	1894.....	1,103,694	89,786
1875.....	250,348	14,026	1895.....	1,011,235	96,836
1876.....	248,638	4,995	1896.....	1,106,661	116,774
1877.....	301,317	4,829	1897.....	986,130	101,848
1878.....	327,959	5,468	1898.....	1,150,029	99,189
1879.....	306,648	8,468	1899.....	1,293,169	101,004
1880.....	432,188	14,217	1900.....	1,787,777	62,776
1881.....	395,382	14,245	1901.....	1,573,661	53,894
1882.....	412,682	37,576	1902.....	2,090,268	23,453
1883.....	486,811	44,388	1903.....	1,954,629	27,138
1884.....	474,405	62,665	1904.....	1,557,412	27,308
1885.....	427,937	71,003	1905.....	1,635,287	86,792
1886.....	520,703	78,443	1906.....	1,835,041	44,758
1887.....	580,965	89,098	1907.....	1,894,074	101,778
1888.....	588,627	84,316	1908.....	1,729,833	102,071
1889.....	665,315	89,294	1909.....	1,588,099	161,098
1890.....	724,486	82,534	1910.....	2,377,049	159,859
1891.....	971,259	77,827	1911.....	1,500,639	133,943
1892.....	823,733	93,988			

Coal imported is subdivided into three classes: anthracite, including anthracite dust; bituminous round and run of the mine; and bituminous slack such as will pass through a  $\frac{3}{4}$ " screen. The imports of anthracite in 1911 were 4,020,577 tons valued at \$18,794,192, an average of \$4.67 per ton, thus showing an increase of 754,342 tons over the 1910 imports. The imports of bituminous round and run of the mine in 1911 were 8,905,815 tons valued at \$18,407,603, an average of \$2.07 per ton; showing an increase of 2,939,349 tons or 49.3 per cent over the 1910 imports. The imports of bituminous slack in 1911 were 1,632,500 tons valued at \$2,090,796 or an average of \$1.28 per ton, showing an increase of 267,219 tons or 19.6 per cent over the 1910 imports.

COAL.—TABLE 6.  
Imports of Coal into Canada.

Fiscal Year.	BITUMINOUS COAL.		ANTHRACITE COAL AND ANTHRACITE DUST.		BITUMINOUS COAL DUST.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
1880.....	457,049	1,220,761	516,729	1,509,960	3,565	8,877
1881.....	587,024	1,741,568	572,092	2,325,937	337	666
1882.....	636,374	1,992,081	638,273	2,666,356	471	900
1883.....	911,629	2,996,198	754,891	3,344,936	8,154	10,082
1884.....	1,118,615	3,613,470	868,000	3,831,283	12,782	14,600
1885.....	1,011,875	3,197,539	910,324	3,909,844	20,185	20,412
1886.....	930,949	2,591,554	995,425	4,028,050	36,230	36,996
1887.....	1,149,792	3,126,225	1,100,165	4,423,062	31,401	33,178
1888.....	1,231,234	3,451,661	+2,138,627	5,291,875	28,808	34,730
1889.....	1,248,540	3,255,171	1,291,705	5,199,481	39,980	47,139
1890.....	1,409,282	3,528,959	1,201,335	4,595,727	53,104	29,818
1891.....	1,598,855	4,060,896	1,399,067	5,224,452	60,127	36,130
1892.....	1,615,220	4,099,221	1,479,106	5,640,346	82,091	39,840
1893.....	1,603,154	3,967,764	1,500,550	6,355,285	109,585	44,474
1894.....	1,359,509	3,315,094	1,530,522	6,354,040	117,573	49,510
1895.....	1,444,928	3,321,387	1,404,342	5,350,627	181,318	52,221
1896.....	1,538,489	3,299,025	1,574,355	5,667,096	210,386	53,742
1897.....	1,543,476	3,254,217	1,457,295	5,695,168	225,562	59,609
1898.....	1,684,024	3,179,595	1,460,701	5,874,685	229,445	45,556
1899.....	2,171,358	3,691,946	1,745,460	6,490,509	276,547	44,717
1900.....	2,439,764	4,310,964	1,674,401	6,602,912	330,174	98,349
1901.....	2,516,392	4,956,025	1,933,283	7,923,950	414,432	275,559
1902.....	3,047,392	5,712,058	1,652,451	7,021,939	489,548	264,550
1903.....	3,511,412	7,776,717	1,456,713	7,028,664	550,883	420,317
1904.....	4,053,900	9,108,208	2,275,018	10,461,223	608,041	544,128
1905.....	4,176,274	8,002,896	2,604,137	12,093,371	650,261	343,456
1906.....	4,495,550	8,360,348	2,200,863	10,304,308	747,251	489,180
Calendar Year.	Bituminous round and run of the mine.				Bituminous slack such as will pass through a $\frac{3}{4}$ " screen.	
1907.....	6,370,152	13,232,445	3,141,873	14,506,129	1,139,256	1,121,949
1908.....	6,025,574	12,516,748	3,160,110	14,478,536	1,111,811	1,355,677
1909.....	5,625,063	11,455,818	3,017,844	13,906,152	1,230,017	1,469,889
1910.....	5,966,466	11,919,341	3,266,235	14,735,062	1,365,281	1,795,598
1911.....	(a) 8,905,815	18,407,603	(b) 4,020,577	18,794,192	(c) 1,632,500	2,090,796

(a). Duty, 53c. per ton. (b). Coal, anthracite, and anthracite coal dust; duty free. (c). Duty 14c. per ton.

+ In the anthracite column the imports show a very considerable increase in 1888 over 1887, an increase of over 91 per cent, the falling off again in 1889 being quite as remarkable. The average values per ton for the three years 1887, 1888, and 1889, were \$1.02, \$2.47, and \$4.03 respectively. Although a duty of 50c. per ton on anthracite coal was removed May 13, 1887, it is hardly thought this would account for the changes indicated, and unless some error may possibly have crept into the Trade and Navigation report, no explanation is available.



The total consumption of coal in Canada during 1911, deduced from the records of production, exports and imports, was 24,247,698 tons, as compared with 20,970,226 tons in 1910; an increase of 3,277,472 tons or 15·6 per cent. Of the total consumption during the past year 9,822,749 tons or 40·5 per cent was domestic coal and 14,424,949 imported coal.

The per capita consumption in 1911, based on an estimate of the population made by the Census Office, was approximately 3·388 tons. This is the largest per capita consumption on record. The consumption in Canada is still small when compared with that of the United States, where the production has reached a total of about 5 tons per capita.

### Consumption of Coal in Canada, 1910-1911.

	1910.		1911.	
	Tons.	Tons.	Tons.	Tons.
Production, Table 3.....	12,909,152	.....	11,323,388	9,822,749
Exports of Canada, Table 4.....	2,377,049	.....	1,500,639	
Home consumption of Canadian coal.....	.....	10,532,103	.....	
Imports, Table 6.....	10,597,982	.....	14,558,892	
Exports not produce of Canada, Table 4.....	159,859	.....	133,943	14,424,949
Canadian consumption of imported coal.....	.....	10,438,123	.....	
Total consumption of coal in Canada.....	.....	20,970,226	.....	24,247,698

### COAL.—TABLE 7.

### Consumption of Coal in Canada, 1886-1911.

Calendar Year.	Canadian.	Imported.	Total.	Percentage Canadian.	Percentage imported.	Consumption per capita.
	Tons.	Tons.	Tons.	%	%	Tons.
1886.....	1,595,950	1,884,161	3,480,111	45·9	54·1	0·758
1887.....	1,848,365	2,192,260	4,040,625	45·7	54·3	0·871
1888.....	2,013,925	3,314,353	5,328,278	37·8	62·2	1·137
1889.....	1,992,988	2,490,931	4,483,919	44·4	55·6	0·946
1890.....	2,360,196	2,581,187	4,941,383	47·8	52·2	1·031
1891.....	2,606,490	2,980,222	5,586,712	46·7	53·3	1·153
1892.....	2,464,012	3,082,429	5,546,441	44·4	55·6	1·133
1893.....	2,823,187	3,110,462	5,933,649	47·6	52·4	1·198
1894.....	2,743,376	2,917,818	5,661,194	48·5	51·5	1·130
1895.....	2,467,109	2,933,752	5,400,861	45·7	54·3	1·066
1896.....	2,639,055	3,206,456	5,845,511	45·1	54·9	1·140
1897.....	2,799,977	3,124,485	5,924,462	47·3	52·7	1·143
1898.....	3,023,079	3,274,981	6,298,060	48·0	52·0	1·200
1899.....	3,631,882	4,092,361	7,724,243	47·0	53·0	1·454
1900.....	3,989,542	4,361,563	8,351,105	47·8	52·2	1·561
1901.....	4,912,664	4,810,213	9,722,877	50·5	49·5	1·797
1902.....	5,376,413	5,165,938	10,542,351	51·0	49·0	1·895
1903.....	6,005,735	5,491,879	11,507,605	52·2	47·8	2·018
1904.....	6,697,183	6,909,651	13,606,834	49·2	50·8	2·325
1905.....	7,032,661	7,343,880	14,376,541	48·9	51·1	2·391
1906.....	7,927,560	7,398,906	15,326,466	51·7	48·3	2·477
1907.....	8,617,352	10,549,503	19,166,855	45·0	55·0	3·034
1908.....	9,156,478	10,195,424	19,351,902	47·3	52·7	2·976
1909.....	8,913,376	9,711,826	18,625,202	47·9	52·1	2·779
1910.....	10,532,103	10,438,123	20,970,226	50·2	49·8	3·031
1911.....	9,822,749	14,424,949	24,247,698	40·5	59·5	3·388



### Nova Scotia.

The production of coal in Nova Scotia in 1911 was reported as 7,004,420 tons, as compared with a production of 6,431,142 tons in 1910, showing an increase of 573,278 tons or nearly 9 per cent. This is entirely bituminous coal and represents the output of 14 operating companies, one of which, the Dominion Coal Company, contributed about 62 per cent of the total.

Of the production in 1911, the quantity sold for consumption in Canada was reported as 5,462,828 tons, while 385,095 tons were reported as sold for export to the United States and 236,609 tons sold for export to other countries; 646,340 tons were used for colliery consumption and by workmen, and 273,548 tons were used by colliery operators in making coke and in steel making. A considerable tonnage of coal sold for consumption in Canada was also used in making coke, the total tonnage used for coke making being 846,695 tons.

About 38 per cent only of the total sales were for consumption within the Province itself. Almost an equal quantity was sold for consumption in the Province of Quebec. The adjacent Provinces of New Brunswick and Prince Edward Island, and the colony of Newfoundland, take annually about 1,000,000 tons or 14½ per cent of the present output.

There are five principal coal-fields in the Province, that affording the largest production being the Sydney coal-field in Cape Breton county. The production in Cape Breton county in 1911 was 5,302,477 tons or 75.7 per cent of the total; Pictou county produced 836,776 tons or 12 per cent of the total; Cumberland county 525,925 tons or 7.5 per cent of the total, and Inverness and other counties 339,242 tons or 4.8 per cent of the total.

Annual statistics of the production of coal in Nova Scotia since 1872 are shown in Table 8, the figures being given in both long and short tons; the production by counties during the past six years is shown in Table 9. The record in each case covers the calendar year.

The statistics published by the Provincial Department of Mines cover the fiscal year ending September 30, and the details of colliery output during the year ending Sept. 30, 1911, as published in the Provincial Mines Report, are shown below; while the colliery output during the last three fiscal years is shown in Table 10 and the distribution of coal sold during the same periods in Table 11.

# COAL.

Production and Sales by Companies, Nova Scotia, year ending September 30, 1911, in short tons.

Name of company.	Output.	Sales.	Colliery consumption.	Supplied workmen.		Supplied locomotive.		Reported unsaleable.	Tons on bank at close of year.
				Tons.	Tons.	Tons.	Tons.		
Dominion Coal Co., Ltd.	4,360,113	3,971,278	246,112	48,939	23,514	.....	.....	.....	125,840
Nova Scotia Steel & Coal Co., Ltd.	848,762	779,316	33,556	20,080	3,925	.....	.....	.....	48,342
Cumberland Railway & Coal Co., Ltd.	214,871	156,537	42,927	4,654	3,269	.....	.....	.....	7,602
Acadia Coal Co.	522,297	417,648	83,898	10,985	1,384	.....	.....	.....	22,498
Maritime Coal, Railway & Power Co.	183,416	16,096	18,664	3,372	1,438	.....	.....	.....	.....
Inverness Railway & Coal Co.	326,577	300,969	20,300	6,015	10,376	.....	.....	.....	3,731
Intercolonial Coal Co.	293,000	268,016	38,049	7,289	802	.....	.....	.....	11,042
Sydney Coal Co.	4,129	3,767	96	153	.....	.....	.....	.....	410
MacKay Colliery	32,571	30,463	1,887	460	.....	.....	.....	.....	.....
North Atlantic Collieries Co.	53,751	40,065	3,690	1,234	.....	.....	.....	.....	3,143
Port Hood Coal Co.	46,135	38,031	8,798	1,261	.....	.....	.....	.....	297
Minudie Coal Co.	61,019	51,670	3,120	1,267	.....	.....	.....	.....	.....
Atlantic Grindstone & Coal Co.	374	312	25	37	.....	.....	.....	.....	.....
Colonial Mining Co.	5,033	3,517	2,164	141	.....	.....	.....	.....	.....
Great Northern Coal Co.	1,419	692	608	39	.....	.....	.....	.....	79
	6,953,457	6,078,377	509,894	105,926	44,930	.....	.....	7,657	217,984

COAL.—TABLE 8.

## Nova Scotia: Output, Sales, Colliery Consumption, and Production.

Calendar Year.	Output, tons, 2,240 lbs.	Sold or used, tons, 2,240 lbs.	Colliery consump- tion, tons, 2,240 lbs.	Production, tons, 2,240 lbs.	Output, tons, 2,000 lbs.	Sold or used, tons, 2,000 lbs.	Colliery consump- tion, tons, 2,000 lbs.	Production* tons, 2,000 lbs.	Price per ton, 2,240 lbs.	Value of production. \$
1872.....	880,950	785,914	110,341	896,255	986,664	880,224	123,582	1,003,806	1 75	1,568,446
1873.....	1,051,467	881,106	108,398	989,504	1,177,643	986,839	121,406	1,108,245	1 75	1,731,632
1874.....	872,720	749,127	119,582	868,709	977,446	839,022	133,932	972,954	1 75	1,520,240
1875.....	781,165	706,795	124,110	830,905	874,905	791,610	139,003	930,613	1 75	1,454,084
1876.....	709,646	634,207	113,788	747,945	794,804	710,312	127,443	837,755	1 75	1,308,991
1877.....	757,496	687,065	98,841	785,906	848,396	769,513	110,702	880,215	1 75	1,375,339
1878.....	770,603	693,511	88,627	782,138	863,075	776,732	94,262	876,994	1 75	1,368,741
1879.....	788,271	688,624	84,787	773,411	882,863	771,259	94,961	866,220	1 75	1,353,469
1880.....	1,032,710	934,659	96,831	1,051,490	1,156,635	1,069,218	108,451	1,777,669	1 75	1,840,108
1881.....	1,124,270	1,035,014	107,888	1,142,902	1,259,183	1,159,216	120,834	1,280,050	1 75	2,000,079
1882.....	1,365,811	1,250,179	111,381	1,361,560	1,529,708	1,400,200	124,747	1,524,947	1 75	2,382,730
1883.....	1,422,553	1,297,523	111,949	1,409,472	1,603,269	1,463,226	125,383	1,578,609	1 75	2,466,576
1884.....	1,389,295	1,261,650	116,769	1,378,419	1,556,011	1,413,048	130,781	1,543,829	1 75	2,412,233
1885.....	1,352,205	1,254,510	127,624	1,382,134	1,514,470	1,405,051	142,939	1,547,990	1 75	2,418,735
1886.....	1,502,611	1,373,666	142,421	1,516,087	1,682,924	1,538,506	159,512	1,698,018	1 75	2,653,152
1887.....	1,670,830	1,519,684	139,777	1,659,461	1,871,330	1,702,046	166,550	1,858,596	1 75	2,904,037
1888.....	1,776,128	1,576,692	157,443	1,734,135	1,989,263	1,765,895	176,336	1,942,231	1 75	3,034,735
1889.....	1,756,279	1,555,107	158,131	1,713,238	1,967,682	1,741,720	177,107	1,918,827	1 75	2,998,167
1890.....	1,984,001	1,736,111	161,240	1,947,351	2,222,081	2,000,444	180,589	2,181,033	1 75	3,407,864
1891.....	2,044,784	1,849,945	174,283	2,024,928	2,290,158	2,071,938	195,981	2,267,919	1 75	3,543,624
1892.....	2,042,784	1,752,934	175,092	1,928,026	2,175,913	1,963,286	196,103	2,159,389	1 75	3,374,046
1893.....	2,223,632	1,977,543	205,425	2,182,968	2,489,807	2,214,848	230,076	2,444,924	1 75	3,820,194
1894.....	2,230,631	2,060,920	196,206	2,257,196	2,520,707	2,308,231	219,751	2,527,982	1 75	3,949,970
1895.....	1,999,756	1,793,098	193,639	1,986,737	2,239,727	2,008,270	216,875	2,257,145	1 75	3,919,355
1896.....	2,292,675	2,046,828	192,975	2,239,808	2,537,706	2,202,447	216,132	2,508,570	1 75	3,919,355
1897.....	2,340,031	2,044,672	181,716	2,226,388	2,584,175	2,375,661	203,522	2,403,534	1 75	4,004,970
1898.....	2,262,656	2,121,126	187,428	2,288,554	2,584,175	2,375,661	203,522	2,403,534	1 75	4,004,970
1899.....	2,865,443	2,633,989	277,460	2,811,449	3,209,296	2,950,067	238,775	3,148,822	2 00	5,622,808
1900.....	3,298,791	2,988,737	336,563	3,235,300	3,694,646	3,358,585	264,051	3,623,536	2 50	8,058,250
1901.....	3,821,033	3,411,127	301,484	3,712,561	4,279,557	3,890,462	337,606	4,158,068	1 75	6,496,982
1902.....	4,223,480	3,911,127	379,198	4,608,318	5,252,538	4,736,614	424,702	5,161,316	2 00	9,216,636
1903.....	5,215,562	4,563,720	481,903	5,047,623	5,841,429	5,113,607	539,731	5,653,338	2 00	10,005,246
1904.....	5,131,935	4,551,740	144,904	4,996,644	5,747,823	5,097,949	498,292	5,536,241	2 00	9,993,288

COAL.—TABLE 8—Continued.

## Nova Scotia: Output, Sales, Colliery Consumption, and Production.

Calendar Year.	Output, tons, 2,240 lbs.		Colliery consumption, tons, 2,240 lbs.		Sold or used, tons, 2,240 lbs.		Production, tons, 2,240 lbs.		Output, tons, 2,000 lbs.		Sold or used, tons, 2,000 lbs.		Colliery consumption, tons, 2,000 lbs.		Production* tons, 2,000 lbs.		Price per tons, 2,240 lbs.		Value of production.
	Raised.	Sales.	Raised.	Sales.	Raised.	Sales.	Raised.	Sales.	Raised.	Sales.	Raised.	Sales.	Raised.	Sales.	Raised.	Sales.			
1905.....	5,197,877	4,613,818	427,774	5,041,592	5,821,622	5,167,476	479,107	5,646,583	5,821,622	5,167,476	479,107	5,646,583	479,107	5,646,583	2 00	10,083,184			
1906.....	5,844,813	5,093,131	460,891	5,554,022	6,546,191	5,704,307	516,198	6,220,505	6,546,191	5,704,307	516,198	6,220,505	516,198	6,220,505	2 00	11,108,044			
1907.....	5,773,503	5,236,077	437,256	5,673,333	6,468,563	5,864,406	489,727	6,354,133	6,468,563	5,864,406	489,727	6,354,133	489,727	6,354,133	2 25	12,764,999			
1908.....	6,076,330	5,224,787	576,509	5,939,767	6,805,489	5,851,761	645,690	6,652,539	6,805,489	5,851,761	645,690	6,652,539	645,690	6,652,539	2 25	13,364,476			
1909.....	5,106,135	4,524,029	522,376	5,046,508	5,718,871	5,066,912	585,177	5,652,089	5,718,871	5,066,912	585,177	5,652,089	585,177	5,652,089	2 25	11,394,643			
1910.....	5,817,109	5,199,715	542,376	5,742,091	6,515,162	5,823,681	607,461	6,431,142	6,515,162	5,823,681	607,461	6,431,142	607,461	6,431,142	2 25	12,919,705			
1911.....	6,362,099	5,676,857	577,089	6,253,946	7,125,551	6,358,080	646,340	7,004,420	7,125,551	6,358,080	646,340	7,004,420	646,340	7,004,420	2 25	14,071,379			

\*This production is obtained by adding sales and colliery consumption.

COAL.—TABLE 9.

## Nova Scotia: Coal trade by Counties, in short tons, Calendar Years 1906-7-8-9-10-11.

Calendar Year.	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTRIES.		Total.	
	Raised.	Sales.	Raised.	Sales.	Raised.	Sales.	Raised.	Sales.	Raised.	Sales.
1906.....	659,734	566,308	769,496	657,310	4,804,407	4,221,293	312,554	259,396	6,546,191	5,704,307
1907.....	534,047	445,288	840,533	725,043	4,638,147	4,346,180	395,836	343,895	6,468,563	5,864,406
1908.....	662,157	530,648	849,802	678,025	4,267,346	4,267,346	452,877	375,742	6,803,489	6,354,133
1909.....	494,919	403,371	743,860	599,743	4,081,333	3,723,135	398,759	340,663	5,718,871	5,066,912
1910.....	350,363	288,706	714,846	588,678	5,085,800	4,571,347	414,153	374,950	6,515,162	5,823,681
1911.....	538,296	436,125	833,956	691,852	5,406,355	4,917,902	347,944	312,201	7,125,551	6,358,080

Sales include coal used for making coke and steel.

COAL.—TABLE 10.

**Nova Scotia: Output by Collieries during Fiscal Years ending September 30,  
1909-10-11.**

Colliery.	1909. Tons of 2,000 lbs.	1910. Tons of 2,000 lbs.	1911. Tons of 2,000 lbs.
<i>Cape Breton County.</i>			
Dominion Coal Company. ....	3,119,556	3,634,124	4,360,113
Nova Scotia Steel and Coal Co. ....	848,444	936,710	848,762
North Atlantic Collieries. ....	81,292	99,687	53,751
McKay Mining Company. ....	15,217	19,136	32,571
Sydney Coal Company. ....	5,301	4,464	4,129
Colonial Mining Co. ....	709	15,625	5,023
<i>Cumberland County.</i>			
Cumberland Railway and Coal Co. ....	421,437	60,298	214,871
Maritime Coal, Railway, and Power Co., Chignecto. ....	56,392	{ 181,264 }	183,416
" " " " " Joggins. ....	55,620		
Minudie Coal Co. ....	55,766		
Strathcona Coal Co. ....	7,936	61,037	61,019
Great Northern Coal Co. ....	4,272	988	1,419
Atlantic Grindstone and Coal Co. ....	721	239	374
Eastern Coal Co. ....	4,940	7,381	
<i>Colchester County.</i>			
Colchester Coal Co. ....	1,490		
<i>Pictou County.</i>			
Acadia Coal Co. ....	408,792	397,962	522,297
Intercolonial Coal Co. ....	327,576	307,692	293,000
Marsh colliery. ....	22,585		
<i>Inverness County.</i>			
Inverness Coal and Railway Co. ....	296,546	310,528	326,577
Mabou Coal Co. ....	1,804		
Port Hood Coal Co. ....	106,669	97,269	46,135





Number and Classes of Workmen employed at each mine in Nova Scotia, Year ending September 30, 1911.

Company.	UNDERGROUND.				SURFACE.				CONSTRUCTION.			TOTALS.		HORSES.		PIT DAYS.
	Skilled labour.	Labourers.	Boys.	Days.	Skilled labour.	Labourers.	Boys.	Days.	Skilled labour.	Labourers.	Days.	Persons.	Days.	Above.	Below.	
Dominion Coal Co. ....	2,729	1,565	269	1,339,746	526	380	61	255,469	.....	.....	.....	5,530	1,595,215	85	514	269
Nova Scotia Steel and Coal Co. ....	1,050	803	205	530,896	146	205	33	111,816	.....	.....	.....	2,442	642,712	4	110	274
Cumberland Railway and Coal Co. ....	259	296	32	168,883	87	120	5	62,672	.....	2	838	803	232,393	18	40	293
Acadia Coal Co. ....	343	354	82	251,538	90	275	19	136,940	.....	.....	.....	1,163	388,478	31	47	291
Intercolonial Coal Co. ....	349	152	84	149,756	92	114	26	57,732	.....	1	499	819	207,987	12	33	295
Mar. Coal, Ry. and Power Co., Joggins. ....	269	83	7	106,124	21	49	11	24,086	.....	.....	.....	440	130,210	6	12	293
Inverness Railway and Coal Co. ....	312	130	21	137,725	42	43	11	29,161	.....	.....	.....	559	166,886	6	28	297
Sydney Coal Co. ....	29	8	3	10,357	6	5	2	3,224	.....	.....	.....	53	13,581	1	1	174
Mackay Mining Co. ....	6	2	..	1,759	1	2	.....	694	.....	.....	.....	15	2,517	1	1	168
North Atlantic Collieries. ....	36	13	..	14,506	5	8	.....	4,174	.....	1	3	66	18,934	3	3	293
Port Hood Coal Co. ....	70	29	16	32,623	12	32	7	13,477	.....	1	3	166	46,099	7	13	266
Great Northern Coal Co. ....	196	37	9	22,872	15	21	3	9,973	.....	.....	.....	277	32,845	4	5	183
Minudie Coal Co. ....	4	1	..	1,049	1	2	.....	688	.....	2	1	11	2,449	.....	.....	67
Atlantic Grindstone and Coal Co. ....	92	16	15	31,114	14	14	4	9,504	.....	1	440	156	41,038	3	1	246
Colonial Coal Co. ....	2	2	.....	288	2	.....	.....	380	.....	.....	.....	4	668	.....	.....	102
.....	9	2	.....	3,249	4	2	1	1,868	.....	.....	.....	18	5,117	1	2	300
.....	5,755	3,491	739	2,802,534	1,064	1,272	183	721,858	8	10	2,757	12,522	3,527,149	182	810	.....

### New Brunswick.

The coal production in New Brunswick is derived from the Grand Lake coal-field, in Queens county, in which a comparatively large number of small mines are intermittently operated. Only about 50 per cent of the production has been reported by the producers.

The actual shipments during 1911 are estimated by the Provincial Department of Works at 53,781 tons. Adding 2,000 tons for colliery consumption, workmen, etc., the production is placed at 55,781 tons, practically the same production as 1910.

COAL.—TABLE 12.

#### New Brunswick: Production.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
		\$	\$ cts.			\$	\$ cts.
1887.....	10,040	23,607	2 35	1900.....	10,000	15,000	1 50
1888.....	5,730	11,050	1 93	1901.....	17,630	51,857	2 94
1889.....	5,673	11,733	2 07	1902.....	18,795	39,680	2 11
1890.....	7,110	13,850	1 95	1903.....	16,000	40,000	2 50
1891.....	5,422	11,030	2 03	1904.....	9,112	18,224	2 00
1892.....	6,768	9,375	1 39	1905.....	29,400	58,800	2 00
1893.....	6,200	9,837	1 59	1906.....	34,076	68,152	2 00
1894.....	6,469	10,264	1 59	1907.....	34,584	77,814	2 25
1895.....	9,500	14,250	1 50	1908.....	60,000	135,000	2 25
1896.....	7,500	11,250	1 50	1909.....	49,029	98,496	2 25
1897.....	6,000	9,000	1 50	1910.....	55,455	110,910	2 00
1898.....	6,160	9,240	1 50	1911.....	55,781	111,562	2 00
1899.....	10,528	15,792	1 50				

### Saskatchewan.

Returns were received from 16 separate collieries in this Province during 1911, showing a total production<sup>1</sup> of 206,779 tons of lignite coal valued at \$347,248, an increase of 25,623 tons or 14 per cent over the production reported for 1910.

Of the 1911 production, 198,768 tons were sold for consumption in Canada and 8,011 tons used by the producers for colliery consumption and for workmen.

The output which has hitherto been obtained entirely from the Estevan and Souris fields in the southern portion of the Province, is used mainly for domestic purposes in Saskatchewan and Manitoba.

During 1911 a new colliery was opened on section 60, township 10, range 28, west of the 2nd Meridian, about 40 miles south of Moosejaw and 115 miles west of the Estevan field, by the Consumers Coal Company, Ltd., of Moosejaw. As yet this district has no railway communication and the production is entirely for local consumption. The present plant has a capacity of 75 tons per day.

<sup>1</sup> Figures have since been increased by 1,400 tons valued at \$2,600.

As soon as railway facilities are available, the Company proposes to install a plant with a daily capacity of 500 tons.

The principal operating mines of the Estevan field are the Western Dominion Collieries, Ltd., and the Manitoba and Saskatchewan Coal Company, each with an output close to 100,000 tons. Amongst the other mines the chief operators are: The Estevan Coal and Brick Co., The Maple Leaf Mines, Ltd., The Excelsior Coal Mining Company, Geo. Parkinson, Bastien and Sons, and The Kelly mine.

COAL.—TABLE 13.

**Saskatchewan: Annual Production.**

Calendar Year.	Tons.	Value.	Average value per ton.	Calendar Year.	Tons.	Value.	Average value per ton.
		\$	\$ cts.			\$	\$ cts.
1890.....	200	200	1 00	1901.....	45,000	72,000	1 60
1891.....				1902.....	70,400	112,640	1 52
1892.....	5,400	9,325	1 73	1903.....	116,703	169,618	1 45
1893.....	8,325	12,485	1 50	1904.....	124,885	187,021	1 50
1894.....	†15,051	15,153	1 01	1905.....	107,596	152,334	1 42
1895.....	15,769	31,538	2 00	1906.....	108,398	164,146	1 51
1896.....	16,706	25,059	1 50	1907.....	151,232	252,437	1 67
1897.....	25,000	37,500	1 50	1908.....	150,556	253,790	1 69
1898.....	25,000	37,500	1 50	1909.....	192,125	296,339	1 54
1899.....	25,000	37,500	1 50	1910.....	181,156	293,923	1 62
1900.....	40,500	60,750	1 50	1911.....	206,779	347,248	1 68

† Including a small quantity from the Turtle Mountain district, Manitoba.

**Alberta.**

The production of coal in Alberta has shown a steady increase each year since 1899 and under ordinary operating conditions the output in 1911 would undoubtedly have been greater than that of 1910. The closing down of the principal bituminous collieries in the southern part of the Province, however, for a period of nearly eight months of the year, due to the coal miners' strike to which reference has already been made, resulted in a greatly reduced output in 1911. The production of marketable coal during this year, according to direct returns received from the operators, was 1,511,036 tons, valued at \$3,979,264, or an average of \$2.63 per ton, as compared with 2,894,469 tons, valued at \$7,065,736, produced in 1910, showing a falling off of 1,383,433 tons or 48 per cent. The coal production of this Province includes the only anthracite mined in Canada, 90,460 tons in 1911, together with bituminous and lignite coals.

Of the total production in 1911, 1,304,778 tons were sold for consumption in Canada and 40,884 tons for export. The producers used 103,783 tons for colliery consumption and for workmen, and 61,591 tons were used in making coke. In 1910, the quantity sold for consumption in Canada was 2,309,438 tons, while

243,371 tons were sold for export to the United States, 145,410 tons were used for colliery consumption and by workmen, and 196,250 tons were used in making coke.

The production of 21 of the principal operating companies is shown in the following table. It will be observed that most of these companies were in operation for from three to four months only during the year and consequently their output is only about one-third or less of their capacity. These 21 companies produced a total of 1,003,035 tons, and 14 other companies, with an output of over 10,000 tons each, from whom permission for publication was not received, produced a total of 310,441 tons. Thus about 87 per cent of the total production was obtained from 35 operators, having an output exceeding 10,000 tons each.

**Production of Coal in Alberta in 1911 by Principal Collieries, in short tons.**

Name of Company.	Days in operation.	Total sales.	Total for colliery use.*	Total production.
The Davenport Coal Co., Burmis .....	104	21,669	300	21,969
The Hillcrest Coal and Coke Co., Hillcrest. ....	168	44,664	4,025	48,689
Leitch Collieries Ltd., Passburg .....	153	52,315	2,310	54,625
Maple Leaf Coal Co., Bellevue .....	144	13,150	1,138	14,288
Canadian Coal Consolidated Co., Frank .....	86	24,912	12,514	37,426
West Canadian Collieries, Blairmore mine .....	122	79,604	(c) 36,107	115,711
" " Lille " .....	89			
" " Bellevue " .....	30			
International Coal and Coke Co., Coleman .....	100	92,869	(d) 46,158	139,027
The Canmore Coal Co., Canmore .....	32	26,673	2,105	28,778
Bankhead Mines, Ltd., Bankhead .....	77	(a) 78,609	(b) 11,851	90,460
Jasper Park Collieries, Pocahontas .....	96	10,619	350	10,969
Breckenridge & Lund Coal Co., Lundbreck .....	252	43,482	1,123	44,605
Alberta Railway & Irrigation Co., Lethbridge .....	104	131,859	7,041	138,900
Eureka Coal Co., Taber .....	273	12,914	2,430	15,344
Rock Springs Sootless Coal Co., Taber .....	264	20,543	3,000	23,543
Red Cliff Brick and Coal Co., Redcliff .....	268	17,652	.....	17,652
Round Hill Collieries, Round Hill .....	144	12,825	137	12,962
Edmonton Standard Coal Co., Edmonton .....	300	29,300	900	30,200
Ritchie Coal Co., Edmonton .....	168	10,000	550	10,550
Messrs. Love & Cameron, Edmonton .....	300	10,000	50	10,050
Alberta Coal Mining Co., Edmonton .....	200	33,708	2,500	36,208
Cardiff Collieries, Ltd., Cardiff .....	300	99,879	1,200	101,079
14 other companies, each producing over 10,000 tons .....	.....	867,246	135,789	1,003,035
Other companies, each producing under 10,000 tons .....	.....	290,527	19,914	310,441
.....	.....	187,889	9,671	197,560
Total production, Alberta .....	.....	1,345,662	165,374	1,511,036

\* Includes consumption under boilers, workmen, etc.

- (a) " 47,308 tons of briquettes.  
 (b) " 892 " "  
 (c) " 23,754 tons used in making coke.  
 (d) " 37,837 " "



The annual production in Alberta since 1887 is shown in Table 14.

COAL.—TABLE 14.

Alberta: Annual Production.

Calendar Year.	Tons.	Value.	Average value per ton.	Calendar Year.	Tons.	Value.	Average value per ton.
		\$	\$ cts.			\$	\$ cts.
1887.....	74,152	157,577	2 13	1900.....	311,450	778,625	2 50
1888.....	115,124	183,354	1 59	1901.....	340,275	850,687	2 50
1889.....	97,364	179,640	1 85	1902.....	402,819	960,601	2 38
1890.....	128,753	198,298	1 54	1903.....	495,893	1,117,541	2 25
1891.....	174,131	437,243	2 51	1904.....	661,732	1,404,524	2 12
1892.....	178,970	460,605	2 57	1905.....	931,917	1,993,915	2 14
1893.....	230,070	586,260	2 55	1906.....	1,246,360	2,614,762	2 10
1894.....	184,940	473,827	2 56	1907.....	1,591,579	3,836,286	2 41
1895.....	169,885	382,526	2 25	1908.....	1,685,661	4,127,311	2 45
1896.....	209,162	581,832	2 78	1909.....	1,994,741	4,838,109	2 43
1897.....	242,163	630,408	2 60	1910.....	2,894,469	7,065,736	2 44
1898.....	315,088	788,720	2 50	1911.....	1,511,036	3,979,264	2 63
1899.....	309,600	774,000	2 50				

British Columbia.

The same conditions which resulted in the large falling off in coal production in the Province of Alberta were also the cause of a decreased output in British Columbia. The mines of the Crowsnest district, East Kootenay, were closed down for a period of eight months from April to November along with the mines in southwestern British Columbia, owing to the inability of the mine operators and the Labour Union to agree as to wages and working conditions.

The total production in 1911 was 2,542,532 tons, valued at \$7,945,413, as compared with a production of 3,330,745 tons, valued at \$10,408,580, reported in 1910, showing a decrease of 788,213 tons or about 24 per cent.

A large proportion of the coal production of this Province is annually exported; in 1910 nearly 40 per cent or considerably over one-third of the total production was sold for export, while a considerable tonnage, over 11 per cent of the production in 1910, is made into coke. The direct result of the closing down of the Crowsnest Pass, Hosmer, and Corbin collieries was a considerably reduced coke output which in turn seriously affected the operations of the smelting furnaces of the Boundary district and at Trail. A great falling off was also caused in the amount of coal sold for export, only a little more than half as much coal being sold for export in 1911 as in 1910. On the other hand there was a substantial increase in the amount of coal sold for consumption in Canada, and this notwithstanding the keen competition now being given by fuel oil on the coast. Of the total production in 1911, 1,536,957 tons, or 60 per cent, were sold for consumption in Canada, as compared with 1,400,405 tons or 42 per cent similarly disposed of in 1910; 642,754 tons, or 25 per cent of the production, were

sold for export to the United States in 1911, as against 1,248,483 tons or 37.5 per cent in 1910; and 43,465 tons were sold for export to other countries, as against 67,525 tons in 1910. The quantity used by producers in making coke in 1911 was 117,215 tons, only 4.6 per cent of the production, as against 379,893 tons or 11.4 per cent in 1910; and the quantity used by producers under colliery boilers and for workmen in 1911 was 202,141 tons or 8 per cent of the production, as against 234,439 tons in the previous year.

The production of the coast collieries located on Vancouver island, and of the mainland collieries in East Kootenay and Nicola valley is separately shown in the next table. The total production of coal on Vancouver island in 1911 was 1,789,530 tons, as against 1,627,810 tons in 1910, and the production of the Crowsnest Pass and Nicola Valley districts in 1911 was 753,002 tons, as against 1,702,935 tons in 1910. In the latter districts the quantity sold for consumption in Canada in 1911 was 348,188 tons, as against 384,584 tons in 1910, a comparatively small decrease; whereas the quantity sold for export in 1911 was only 237,219 tons, as against 845,113 tons in 1910, or a decrease of nearly 72 per cent.

Coal.	1910.			1911.		
	Coast.	Crowsnest and Nicola valley.	Total.	Coast.	Crowsnest and Nicola valley.	Total.
		Short tons.			Short tons.	
Sold for consumption in Canada .....	1,015,821	384,584	1,400,405	1,188,769	348,188	1,536,957
Sold for export to United States.....	403,370	845,113	1,248,483	405,535	237,219	642,754
Sold for export to other countries.....	67,525	.....	67,525	43,465	.....	43,465
Total sales .....	1,486,716	1,229,697	2,716,413	1,637,769	585,407	2,223,176
Used for making coke.....	5,230	374,662	379,892	.....	117,215	117,215
Used for colliery consumption .....	135,864	98,576	234,440	151,761	50,380	202,141
Production.....	1,627,810	1,702,935	3,330,745	1,789,530	753,002	2,542,532

The coal production by collieries in British Columbia in 1910 and 1911 is shown in the following tables, while the annual production of coal since 1836 is given in Table 15. The total production to the end of 1911 has been 42,649,441 short tons of which 22,617,371 tons or about 53 per cent has been produced during the past ten years.

## Coal Production by Collieries in British Columbia in 1911, in tons of 2,240 lbs.

Colliery.	SALES.			Used in making coke.	Used under colliery boilers, etc.	Lost in washing.	STOCKS.		Output.
	In Canada.	To United States.	To other countries.				First of year.	Last of year.	
1. Protection .....	240,459	140,162	1,736	382,347	34,332	.....	9,712	4,942	411,909
2. Northfield .....	36,145	94,049	2,300	132,494	30,833	.....	1,945	470	161,852
3. Douglas .....	.....	31	.....	31	1,385	.....	.....	.....	1,416
4. Extension .....	255,007	62,494	.....	317,501	14,591	.....	1,981	1,465	331,576
5. Union .....	321,690	42,640	32,782	397,112	39,250	.....	22,515	23,488	437,335
6. Fiddick and Richardson .....	138,938	22,709	2,000	163,647	11,441	22,279	30,829	38,510	205,048
7. Squash .....	1,613	.....	.....	1,613	669	.....	.....	.....	2,282
8. New East Wellington .....	67,549	.....	.....	67,549	3,000	2,069	100	400	72,918
9. Middlesboro .....	184,182	.....	.....	184,182	6,752	.....	259	615	191,290
10. Princeton .....	16,336	1,909	.....	18,245	823	4,328	.....	.....	23,396
11. Coal Creek* .....	26,200	123,377	.....	149,577	13,709	.....	1,529	111	206,556
12. Michel* .....	13,505	51,519	.....	65,024	40,303	.....	159	18	114,384
13. Hosmer* .....	10,721	.....	.....	10,721	11,450	6,503	3,388	1,637	46,638
14. Corbin .....	44,154	34,998	.....	79,152	2,567	.....	.....	.....	81,719
15. Diamond Vale .....	5,384	.....	.....	5,384	483	.....	.....	.....	5,384
16. Coal Hill .....	10,400	.....	.....	10,400	.....	.....	.....	.....	10,883
17. West Wellington .....	.....	.....	.....	.....	.....	.....	90	298	208
Total .....	1,372,283	573,888	38,808	1,984,979	180,483	35,179	72,507	72,004	2,304,794

\* In operation during three months owing to strike.

1. The Western Fuel Co.
2. The Canadian Collieries (Dunsuir), Ltd.
3. Pacific Coast Coal Mines, Ltd.
4. The Vancouver-Nanaimo Coal Mining Co., Ltd.
5. Nicola Valley Coal and Coke Co., Ltd.
6. Princeton Coal and Land Co., Ltd.
7. Crowsnest Pass Coal Co., Ltd.
8. Hosmer Mines, Ltd.
9. Corbin Coal and Coke Co., Ltd.
10. Diamond Vale Collieries, Ltd.
11. The Inland Coal and Coke Co., Ltd.
12. Biggs Bros.

## Coal Production by Collieries in British Columbia in 1910, in tons of 2,240 lbs.

Colliery.	SALES.				Used in making coke.	Used under colliery boilers, etc.	Lost in washing.	STOCKS.		Output.
	In Canada.	To United States.	To other countries.	Total.				First of year.	Last of year.	
1 Protection.....	187,923	133,360	10,583	331,866	.....	31,439	.....	8,327	9,711	364,689
Northfield.....	36,035	77,776	6,535	120,346	.....	28,495	.....	2,605	1,945	148,181
2 Extension.....	251,208	72,920	.....	324,128	.....	12,467	43,812	1,906	1,981	380,482
Union.....	308,266	48,623	25,873	382,762	4,670	37,855	79,790	6,986	20,835	518,426
3 Fiddick.....	92,701	27,473	17,259	137,473	.....	10,305	11,602	13,238	25,829	171,971
Squash.....	766	.....	.....	766	.....	1,000	.....	1,050	2,123	2,839
4 New East Wellington.....	29,542	.....	.....	29,542	.....	.....	.....	200	100	29,442
5 Middleboro.....	138,681	.....	.....	138,681	.....	2,987	.....	440	259	141,487
6 Princeton.....	6,278	3,570	.....	9,848	.....	300	.....	.....	1,720	11,868
7 Coal Creek.....	41,110	431,772	.....	472,882	118,432	29,756	.....	36	1,530	622,564
Michel.....	77,290	204,525	.....	281,815	137,134	28,500	.....	27	159	457,581
Carbonado.....	*	*	*	*	*	*	*	*	*	*
8 Hosmer.....	54,098	.....	.....	54,098	68,953	22,086	11,073	1,475	3,388	158,123
9 Corbin.....	10,080	114,790	.....	124,870	.....	1,981	.....	.....	.....	126,581
10 Diamond Vale.....	2,261	.....	.....	2,261	.....	100	.....	.....	70	2,431
11 Coal Hill.....	2,200	.....	.....	2,200	.....	100	.....	.....	.....	2,300
Total.....	1,238,439	1,114,809	60,290	2,413,538	339,189	206,871	146,277	36,290	69,650	3,139,235

\* Not in operation. † Development coal not marketed.

1. The Western Fuel Co.
2. The Canadian Collieries (Dunsmuir), Ltd.
3. Pacific Coast Coal Mines, Ltd.
4. The Vancouver-Nanaimo Coal Mining Co., Ltd.
5. Nicola Valley Coal and Coke Co., Ltd.
6. Princeton Coal and Land Co., Ltd.
7. Crow-nest Pass Coal Co., Ltd.
8. Hosmer Mines, Ltd.
9. Corbin Coal and Coke Co., Ltd.
10. Diamond Vale Collieries, Ltd.
11. Coal Hill Syndicate.



COAL.—TABLE 15.  
British Columbia: Production.

Calendar Year.	Output, tons, 2,240 lbs.	Home consumption, tons, 2,240 lbs.	Sold for export, tons, 2,240 lbs.	PRODUCTION.*		Price per ton, 2,240 lbs.	Value.
				Tons, 2,240 lbs.	Tons, 2,000 lbs.		
1836-52...	10,000	From 1836 to 1873, inclusive, the output is taken as production.			11,200	4 00	40,000
1852-59...	25,398				28,446	4 00	101,592
1859†...	1,989				2,228	4 00	7,956
1860...	14,247				15,957	4 00	56,988
1861...	13,774				15,427	4 00	55,096
1862...	18,118				20,292	4 00	72,472
1863...	21,345				23,906	4 00	85,380
1864...	28,632				32,068	4 00	114,528
1865...	32,819				36,757	4 00	131,276
1866...	25,115				28,129	4 00	100,460
1867...	31,239				34,988	4 00	124,956
1868...	44,005				49,286	4 00	176,020
1869...	35,080				40,098	4 00	143,208
1870...	29,843				33,424	4 00	119,372
1871-2-3...	148,459				166,274	4 00	593,836
1874...	81,547	25,023	56,038	81,061	90,788	3 00	243,183
1875...	110,145	31,252	66,392	97,644	109,361	3 00	292,932
1876...	139,192	17,856	122,329	140,185	157,007	3 00	420,555
1877...	154,052	24,311	115,381	139,692	156,455	3 00	419,076
1878...	170,846	26,166	164,682	190,848	213,750	3 00	572,544
1879...	241,301	40,294	192,096	232,390	260,277	3 00	697,170
1880...	267,595	46,513	225,849	272,362	305,045	3 00	817,086
1881...	228,357	40,191	189,323	229,514	257,056	3 00	688,542
1882...	282,139	56,161	232,411	288,572	323,201	3 00	865,716
1883...	213,299	64,786	149,567	214,353	240,075	3 00	643,059
1884...	394,070	87,388	306,478	393,866	441,130	3 00	1,181,598
1885...	365,596	95,227	237,797	333,024	372,987	3 00	999,072
1886...	326,636	85,987	249,205	335,192	375,415	3 00	1,005,576
1887...	413,360	99,216	334,839	434,055	486,142	3 00	1,302,165
1888...	489,301	115,953	365,714	481,667	539,467	3 00	1,445,001
1889...	579,830	124,574	443,675	568,249	636,439	3 00	1,704,747
1890...	678,140	177,075	508,270	685,345	767,586	3 00	2,056,035
1891...	1,029,097	202,697	806,479	1,009,176	1,130,277	3 00	3,027,528
1892...	826,335	196,223	640,579	836,802	937,218	3 00	2,510,406
1893...	978,294	207,851	768,917	976,768	1,093,980	3 00	2,930,304
1894...	1,012,953	165,776	827,642	993,418	1,112,628	3 00	2,980,254
1895...	939,654	188,349	756,334	944,683	1,058,045	3 00	2,834,049
1896...	894,882	261,984	634,238	896,222	1,003,769	3 00	2,688,666
1897...	802,296	290,310	619,860	910,170	1,019,390	3 00	2,730,510
1898...	1,136,485	375,423	752,863	1,128,286	1,263,680	3 00	3,384,858
1899...	1,306,324	526,058	751,711	1,277,769	1,431,101	3 00	3,833,307
1900...	1,590,178	685,667	914,184	1,599,851	1,791,833	3 00	4,799,553
1901...	1,691,557	799,666	914,163	1,713,829	1,919,488	3 00	5,141,487
1902...	1,641,626	837,871	776,800	1,614,680	1,808,441	3 00	4,844,040
1903...	1,450,663	947,499	549,449	1,496,948	1,676,581	3 00	4,490,844
1904...	1,685,698	1,129,465	533,593	1,663,058	1,862,625	3 00	4,989,174
1905...	1,736,696	1,089,667	647,343	1,737,010	1,945,452	3 00	5,211,030
1906...	1,899,076	1,236,476	679,829	1,916,305	2,146,262	3 00	5,748,915
1907...	2,219,602	1,438,402	673,114	2,111,516	2,364,898	3 50	7,390,306
1908...	2,111,931	1,486,511	597,157	2,083,668	2,333,708	3 50	7,292,838
1909...	2,388,196	1,585,232	741,667	2,326,899	2,606,127	3 50	8,144,147
1910...	3,152,207	1,798,873	1,175,007	2,973,880	3,330,745	3 50	10,408,580
1911...	2,304,794	1,657,422	612,696	2,270,118	2,542,532	3 50	7,945,413

\* This production is obtained by adding 'Home Consumption' and 'Sold for Export'.

† 52,935 tons of this amount were exported as sales without the division into 'Home Consumption' and 'Sold for Export'.

‡ Two months only.



The following general summary of the coal potentialities of British Columbia is quoted from the Annual Report of Mr. W. F. Robertson, Provincial Mineralogist for British Columbia.<sup>1</sup>

'In addition to the areas actually being worked, there is in the Quatsino Mining Division on Quatsino sound a Cretaceous coal-field now being developed by Thos. Pearson and associates, which gives promise of containing extensive beds of coal; prospecting workings have been in progress here for four or five years, with considerable success.'

'The Suquash area is now being opened up by actual mining by the Pacific Coast Coal Mines, Ltd., and has already made small shipments and it is expected that the output will be increased rapidly.'

'On Graham island coal has been known for forty years. Exploratory workings on coal outcrops have been carried on at Camps Robertson and Wilson; at present systematic boring of the measures of the dip to accurately define the beds is being done at several points, to prove the existence of a commercially workable field; when this is done a railway will be built to convey the coal to tide-water—probably on Skidegate inlet.'

To the north of these camps, areas have been located and considerable boring done, with results which show the field to continue nearly to Masset. The eastern extension of the field has not, as yet, been satisfactorily established.'

'In the Peace River valley extensive coal-fields are located and partly prospected but these also are, as yet, far from transportation.'

'Near Bear lake and river, tributaries of the Fraser river near its most northerly head, and thus near the located line of the Grand Trunk Pacific railway, a coal-area is being developed, which, according to the recent reports of engineers who have examined it, has considerable promise, and being near the railway assumes importance, as it is the only known area near the line in British Columbia.'

### Yukon.

The principal coal mining companies operating in the Yukon district are the Five Fingers Coal Co., at Tantalus in the southern Yukon, and the Northern Light, Power, and Coal Co., Ltd., operating the Sourdough mine on Coal creek, 40 miles northwest of Dawson. No report was received from the latter Company respecting their operations during 1911, consequently the only production reported for that year was 2,840 tons, valued at the mine at \$12,780. The total production of the district in 1910 was reported as 16,185 tons, valued at \$110,925.

<sup>1</sup> Annual Report of the Minister of Mines (British Columbia) for the year ending December 31, 1911.

## COAL.—TABLE 16.

## Yukon Territory: Annual Production.

Calendar Year.	Tons.	Value.	Average value per ton.
		\$	\$ cts.
1901.....	*5,864	86,230	14 70
1902.....	4,910	37,280	7 59
1903.....	1,849	29,584	16 00
1904.....			
1905.....	7,000	21,000	3 00
1906.....	7,000	28,000	4 00
1907.....	15,000	60,000	4 00
1908.....	3,847	21,158	5 50
1909.....	7,364	49,502	6 72
1910.....	16,185	110,925	6 85
1911.....	2,840	12,780	4 50

\* Part of this production was mined in 1900.

## COKE.

The statistics of coke production given herewith do not include coke made as a by-product in the manufacture of illuminating gas, but are restricted to the record of the output of 'oven coke' produced chiefly for metallurgical purposes.

The total output of coke in 1911 was 954,388 tons produced from 1,409,844 tons of coal: of which 671,514 tons were produced from domestic coal and 282,874 tons from imported coal.

In 1910 the total production was 901,269 tons produced from 1,373,793 tons of coal, of which 875,310 tons were produced from domestic coal and 25,959 tons from imported coal. The quantity of coke sold or used by the producers in 1911 was 935,651 tons, as compared with 902,715 tons in 1910.

The consumption of coke in Canada is much in excess of the domestic production, there being a considerable importation of coke chiefly into Ontario and Quebec for use in the metallurgical industries.

The imports of coke during the calendar year 1911 were 751,389 tons and the exports 9,852 tons. These figures taken in conjunction with the production of 935,651 tons (sold or used), would indicate a consumption of 1,677,188 tons. Similarly estimated the consumption in 1910 was 1,581,832 tons, and in 1909, 1,449,369 tons.

The production by provinces in 1910 and 1911 and the distribution of coke sold or used in 1911 are shown in the next three tables. While a small increase is shown in total production, there was a very large decrease in the coke output in Alberta and British Columbia due to the closing down of the collieries and coke ovens for about eight months of the year on account of labour disputes. In so far as the total production of Canada is concerned, however, this decrease is more than balanced by the increased output in Ontario due to the placing in operation of the new by-product ovens at Sault Ste. Marie and by the increased production in Nova Scotia.

### Coke Production, 1910.

Province.	Coal charged to ovens.	Output of coke.	STOCK ON HAND.		Coke sold or used.	Value of sales, etc.
			Jan. 1.	Dec. 31.		
	Tons.	Tons.	Tons.	Tons.	Tons.	\$
Nova Scotia.....	756,003	508,025	417	384	508,058	1,655,775
Ontario.....	42,208	25,959		1,274	24,685	148,110
Alberta.....	196,250	123,093	40	1,555	121,578	486,312
British Columbia.....	379,332	244,192	18,759	14,557	248,394	1,172,675
Total.....	1,373,793	901,269	19,216	17,770	902,715	3,462,872

## Coke Production, 1911.

Nova Scotia.....	846,695	562,512	210	5,168	557,554	1,814,977
Ontario.....	384,343	282,874	1,274	24,594	259,554	1,318,303
Alberta.....	61,591	35,059	1,785	625	36,216	146,251
British Columbia.....	117,215	73,943	14,557	6,173	82,327	350,879
Total.....	1,409,844	954,388	17,826	36,560	935,651	3,630,410

## Distribution of Coke Production, 1911.

	Nova Scotia.	Ontario.	Alberta.	British Columbia.	Total.
Sold in Canada.....	13,541	614	27,882	80,908	122,945
Sold for export.....			7,871	1,419	9,290
Total sales.....	13,541	614	35,753	82,327	132,235
Used by maker in blast furnace or otherwise.	544,013	258,940	463	0	803,416
Total sold or used.....	557,554	259,554	36,216	82,327	935,651
Number of ovens in operation December 31.	664	110	226	650	1,650
Number of ovens idle December 31.....	284	100	40	680	1,104
Number of ovens building December 31....	0	0	101	0	101

The annual production of coke since 1886 is shown in Table 1 and the annual production by provinces since 1897 in Table 2.

COKE.—TABLE 1.

## Annual Production, 1886-1911.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar. Year.	Tons.	Value.	Value per ton.
		\$	\$ cts.			\$	\$ cts.
1886.....	35,396	101,940	2 88	1899.....	100,820	350,022	3 47
1887.....	40,428	135,951	3 36	1900.....	157,134	649,140	4 13
1888.....	45,373	134,181	2 96	1901.....	365,531	1,228,225	3 36
1889.....	54,539	155,043	2 84	1902.....	502,043	1,519,185	3 03
1890.....	56,450	166,298	2 95	1903.....	561,318	1,734,404	3 09
1891.....	57,084	175,592	3 08	1904.....	554,083	2,032,048	3 66
1892.....	56,135	160,249	2 85	1905.....	700,488	2,436,211	3 48
1893.....	61,078	161,790	2 65	1906.....	782,055	2,863,503	3 66
1894.....	58,044	148,551	2 56	1907.....	842,003	3,583,468	4 26
1895.....	53,356	143,047	2 68	1908.....	858,257	3,449,361	4 02
1896.....	49,619	110,257	2 22	1909.....	862,011	3,484,393	4 04
1897.....	60,686	176,457	2 91	1910.....	902,715	3,462,872	3 84
1898.....	87,600	286,000	3 26	1911.....	935,651	3,630,410	3 88

## COKE.—TABLE 2.

## Production of Coke by Provinces, 1897-1911.

Calendar Year.	NOVA SCOTIA.		ONTARIO.		BRITISH COLUMBIA.		Alberta.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$		\$
1897.....	41,532	90,950			19,154	85,507		
1898.....	48,400	111,000			39,200	175,000		
1899.....	62,459	178,767			38,361	171,255		
1900.....	61,767	223,395			95,367	425,745		
1901.....	222,694	590,560			142,837	637,665		
1902.....	363,330	899,930			138,713	619,255		
1903.....	371,745	888,094			189,573	846,310		
1904.....	275,927	808,022			257,172	1,148,090	20,984	78,936
1905.....	386,366	1,054,712			269,256	1,202,035	44,866	179,464
1906.....	476,364	1,540,976			236,205	1,054,485	69,486	268,042
1907.....	524,110	1,688,070			241,572	1,049,432	76,321	297,595
1908.....	505,929	1,658,151			276,683	1,482,191	75,645	309,019
1909.....	492,992	1,608,092			281,786	1,509,567	87,233	366,734
1910.....	508,058	1,655,775	24,685	148,110	248,394	1,172,675	121,578	486,312
1911.....	557,554	1,814,977	259,554	1,318,303	36,216	146,251	82,327	350,879

Coke is made in Nova Scotia principally at Sydney and Sydney Mines, but also at Westville, Stellarton, and Londonderry. This Province in 1911 produced about 59 per cent of the total output for Canada and the output is used almost entirely in the manufacture of iron. In Ontario coke is made by the Atikokan Iron Company at Port Arthur for use in the Company's blast furnace, and by the Algoma Steel Company at Sault Ste. Marie. The latter Company have acquired and are operating coal lands in West Virginia for their supply of coal. In Alberta coke ovens are operated at Coleman and Lille, near Blairmore, and in British Columbia at Fernie, Michel, Carbonado, and Hosmer in the Crowsnest pass, and at Union Bay, Vancouver island. The coke output of these Provinces is used chiefly by the copper and lead smelters; finding a market in the United States as well as in British Columbia.

The total number of ovens in active operation on December 31 was 1,650; while 1,104 were reported idle on the same date and 101 in course of construction. In Nova Scotia the Dominion Iron and Steel Company at Sydney has 620 finished ovens, all of the Otto Hoffman by-product type. The by-products from these ovens include tar and ammonia. The tar is sold to the Dominion Tar and Chemical Company, whose works are contiguous to the coke oven plant, and this product is further treated for the manufacture of refined tar, pitch of various grades, benzole, creosote, carbolic acid, etc. The production of tar in 1911, including the production from the by-product ovens at Sault Ste. Marie, was 6,646,155 gallons, and ammonia liquor containing 7,124 tons of sulphate of ammonia. In 1910 the production of tar was 3,963,591 gallons and of sulphate of ammonia 3,491 tons; and in 1909, tar 4,016,824 gallons, and sulphate of



ammonia, 3,351 tons. The Nova Scotia Steel and Coal Company has 30 ovens of the Bauer type and 120 Bernard ovens; the latter are situated near the blast furnace and the surplus gas is used for the production of steam for the electric power plant. The surplus gas from the Bauer ovens is used in generating steam for general colliery use. The other ovens in this Province number 178 and are all of the beehive type. The Atikokan Iron Co., Ltd., has 100 beehive ovens at Port Arthur, Ontario, and the Algoma Steel Company 110 Koppers by-product regenerative ovens at Sault Ste. Marie.

In Alberta the West Canadian Collieries, Ltd., at Lille, has 50 ovens of the Bernard or Belgian type. The ovens of the International Coal and Coke Company at Coleman, 216 in number, are the ordinary beehive as are also the ovens in British Columbia, comprising 1,420 in the Crowsnest district and 150 on Vancouver island. In Alberta, also, the Leitch Collieries, Ltd., are erecting at Passburg 101 Mitchell rectangular ovens.

The following description of these ovens has been furnished by Mr. W. L. Hamilton, Manager of the Leitch Collieries, Ltd.:—

‘This type of oven is similar to the beehive oven in the method of burning and quality of coke produced. They are rectangular in shape, being 30 feet long; 4 feet 10 inches wide; 4 feet 6 inches high at the doors, and 8 feet high at the middle. About 10,000 nine inch bricks are necessary to build one oven. The ovens are spaced 7 feet 7½ inches centre to centre. The side walls and piers are built of stone—as in other ovens, the tops are covered with clay.’

‘The ovens are operated altogether by machinery, electric power being used. The charge of coal is delivered to the oven through a port at the top of the oven, an electric larry of 10 tons capacity being used. The charge is then levelled by a levelling machine, after which the drafts are set, and the coke is burnt much the same as a beehive oven, except that the oven has two doors and drafts must be set on each of them. When the charge is coked the doors are removed and the coke is quenched in the oven, after which the entire oven is pushed at once into the yard; it is then loaded into the railway cars by hand. The larrys, leveller, and pusher, are all manufactured by the Scottdale Foundry & Machine Co., of Scottdale, Pa., who have acquired quite a reputation in designing and building this class of machinery. This equipment is sufficient for a plant of 300 ovens if necessary.’

‘There is a vast saving of time in this type of oven. It requires but two minutes to push out one oven and move to the next, while one man can scarcely draw a beehive oven by hand in less than one hour. As soon as an oven is pushed out it is immediately charged and levelled. The doors are then closed and a great deal of the heat which is lost in a beehive oven is retained, allowing a much larger charge of coal to be coked than in the case of a hand drawn oven.’

‘There is also a large saving in the cost of operation as this machinery does the work of a large number of men. To operate this block of 101 ovens, the following men will be required. One man to charge ovens; one man to operate

## COKE.—TABLE 4.

## Imports of Oven Coke, 1880-1911.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		\$			\$
1880.....	3,837	19,353	1896.....	61,612	203,826
1881.....	5,492	26,125	1897.....	83,330	267,540
1882.....	8,157	36,670	1898.....	135,060	347,040
1883.....	8,943	38,588	1899.....	141,284	362,826
1884.....	11,207	44,518	1900.....	187,878	506,839
1885.....	11,564	41,391	1901.....	308,786	680,138
1886.....	11,858	39,756	1902.....	267,142	842,815
1887.....	15,110	56,222	1903.....	256,723	1,222,756
1888.....	25,487	102,334	1904.....	221,050	765,123
1889.....	29,557	91,902	1905.....	371,593	807,842
1890.....	36,564	133,344	1906.....	480,222	1,311,375
1891.....	38,533	177,605	1907*.....	400,536	1,132,680
1892.....	43,499	194,429	1908.....	619,269	2,166,036
1893.....	41,821	156,277	1909.....	466,292	1,136,624
1894.....	42,864	176,996	1910†.....	702,053	1,695,603
1895.....	43,235	149,434	1911.....	763,114	1,887,413

\* For nine months only.

† Duty free.

both pusher and leveller; two men to quench ovens; four men to put up doors and set drafts; besides the men to load coke from the yard into the cars.'

'Several types of patent oven doors are being tested and eventually the entire block will be equipped at a great saving of time and brick.'

'The purchase of a coke loader is under consideration at the present time. If a machine for this purpose can be made to work satisfactorily it will further reduce the number of men necessary to operate the plant.'

'The coal used for coke is  $\frac{1}{2}$  inch screenings. Before coking it is washed by a Luhrig washery of a capacity of 500 tons per day. Forty-eight hour coke will be made in these ovens, about 300 tons per day being the capacity of the complete plant. At the present time, 25 ovens are being heated up and coke will be made within a couple of weeks.'

Statistics of exports and imports of coke as published by the Customs Department are shown in Tables 3 and 4 following.

The exports during the calendar year 1911 were only 9,852 tons, as against 57,971 tons in 1910 and 74,067 tons in 1909. These exports are almost entirely from British Columbia and Alberta and the falling off in 1911 is, of course, a result of the greatly reduced output of these Provinces.

The record of imports of coke shown in Table 4 covers the fiscal year. The total imports during the calendar year 1911 were 751,389 tons valued at \$1,843,248, as against 737,088 tons valued at \$1,908,725, in 1910.

The operation of the new coke ovens at Sault Ste. Marie would naturally displace a considerable tonnage of coke formerly imported at this point for use in the blast furnaces, but this displacement seems to have been more than balanced by the coke imported to meet the shortage in British Columbia.

COKE.—TABLE 3.

Exports of Coke to the United States, 1897-1911.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1897.....	2,987	6,078	1905.....	116,071	509,908
1898.....	3,774	8,394	1906.....	37,003	168,571
1899.....	5,557	18,726	1907.....	70,617	320,357
1900.....	41,529	131,278	1908.....	58,708	248,759
1901.....	57,505	176,990	1909.....	74,067	329,051
1902.....	62,568	180,920	1910.....	57,971	250,715
1903.....	32,608	135,957	1911.....	9,852	39,823
1904.....	112,463	345,031			

## FELDSPAR.

Feldspar is produced in Canada chiefly from deposits situated in Frontenac county near Verona on the Kingston and Pembroke railway. Some shipments were also made in 1911 from the old Villeneuve mine near High Falls, Ottawa county, Quebec. Several properties were being developed from which small shipments were made, including the Long Lake mine in the Township of Conger, District of Parry Sound, Ontario, the Dominion Improvement and Development Company's property on lot 13, con. V, of North Burgess, and the deposit at Quetachu, Manikuanagan bay, north shore of the Gulf St. Lawrence, owned by the Canadian Feldspar Company, Ltd., of Montreal.

The shipping firms were:—

The Canadian Feldspar Co., Ltd., Montreal, Que.

The Dominion Mining Syndicate (O'Brien & Fowler), Ottawa, Ont.

The Kingston Feldspar & Mining Co., Kingston, Ont.

The McDonald Feldspar Company, Ltd., Verona, Ont.

Ojaipée Silica Feldspar Co., Ltd., 375 Spadina Ave., Toronto, Ont.

The Dominion Improvement & Development Co., Perth, Ont., Box 26.

The total shipments in 1911 were reported as 17,723 tons, valued at \$51,939, or an average of \$2.93 per ton, as compared with shipments of 15,809 tons, valued at \$47,667, or an average of \$3.02 per ton, in 1910.

The greater part of the shipments are exported to the United States, the exports of feldspar in 1911 being reported as 16,150 tons, valued at \$56,085, or an average value per ton of \$3.47.

Practically no feldspar is ground in Canada, the output being exported crude; while Canadian requirements of ground feldspar are imported chiefly from the United States.

The annual imports are not separately shown by the Customs reports but probably exceed 2,000 tons.

Statistics of the production and exports of feldspar are shown in the following table.

## Production and Exports of Feldspar.

Calendar Year.	PRODUCTION.		EXPORTS.	
	Tons.	Value	Tons.	Value.
		\$		\$
1890.....	700	3,500		
1891.....	685	3,425		
1892.....	175	825		
1893.....	575	4,525	50	500
1894.....	Nil.	Nil.	Nil.	Nil.
1895.....		*2,545		2,545
1896.....	972	*2,583	972	2,583
1897.....	1,400	3,290	3,078	5,637
1898.....	2,500	6,250	1,542	4,396
1899.....	3,000	6,000	1,757	5,126
1900.....	318	1,112	379	1,116
1901.....	5,350	10,700	4,367	10,973
1902.....	7,576	15,152	7,374	13,708
1903.....	13,928	18,966	13,760	23,319
1904.....	11,083	22,166	13,960	29,263
1905.....	11,700	23,400	9,161	27,660
1906.....	16,948	40,890	18,183	60,312
1907.....	12,584	29,819	12,068	37,932
1908.....	7,877	21,099	9,524	34,045
1909.....	12,783	40,383	10,834	35,234
1910.....	15,809	47,667	15,601	47,962
1911.....	17,723	51,939	16,150	56,085

\* Exports.



## GRAPHITE.<sup>1</sup>

The total shipments of graphite in 1911 were returned as 1,269 tons, valued at \$69,576, being all refined or milled graphite. The average price per ton was \$54.83, or 2.74 cents per pound.

In 1910 the total shipments of graphite were 1,392 tons, valued at \$74,087, comprising 245 tons of crude graphite, valued at \$2,450, and 1,147 tons of refined graphite, valued at \$71,637, an average of \$62.46 per ton, or 3.12 cents per pound for the refined.

In 1909, the shipments were 864 tons of refined product, valued at \$47,800, an average of \$55.32 per ton. The 1908 shipments totalled 251½ tons, valued at \$5,565, comprising 250 tons of crude, valued at \$5,400, and 1½ tons of refined graphite, valued at \$165; while the 1907 shipments included 459 tons of crude mineral, valued at \$11,000, and 120 tons of refined product, valued at \$5,000.

Statistics of annual production since 1886 are shown in Table 1.

GRAPHITE.—TABLE 1.

### Annual Production.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	500	4,000	1899.....	1,130	24,179
1887.....	300	2,400	1900.....	1,922	31,040
1888.....	150	1,200	1901.....	2,210	38,780
1889.....	242	3,160	1902.....	1,095	28,300
1890.....	175	5,200	1903.....	728	23,745
1891.....	260	1,560	1904.....	452	11,760
1892.....	167	3,763	1905.....	541	16,735
1893.....	Nil.	Nil.	1906.....	387	18,300
1894*.....	3	223	1907.....	579	16,000
1895.....	220	6,150	1908.....	251½	5,565
1896.....	139	9,455	1909.....	864	47,800
1897.....	436	16,240	1910.....	1,392	74,087
1898.....		13,698	1911.....	1,269	69,576

\* Exports.

The graphite shipments in 1911 comprised 374 tons, valued at \$33,084, from mills in the Buckingham district, Province of Quebec, and 895 tons, valued at \$36,492, from mills at Calabogie and Port Elmsley, Ontario.

The total value of the exports of graphite in 1911 are reported as \$77,205. The exports are classified as crude ore and concentrates and manufactures of plumbago. The ore and concentrates exported in 1911 are given as 813 tons, valued at \$43,249, and manufactures of plumbago, valued at \$33,956. Of the ore and concentrates exported 30 tons, valued at \$3,631, were reported as shipped

<sup>1</sup> A special bulletin on graphite has been published by the Mines Branch, entitled "Graphite: its Properties, Occurrences, Refining, and Uses," by Fritz Cirkel, Mines Branch, Department of Mines, 1907.

to Great Britain; 752 tons, valued at \$36,295, to the United States, and 31 tons, valued at \$3,323, to other countries.

The manufactures of plumbago exported included \$2,289 to Great Britain, \$30,062 to the United States, and \$1,605 to other countries.

GRAPHITE.—TABLE 2.

## Exports of Graphite.

Year.	CRUDE ORE AND CON- CENTRATES.		MANU- FACTURES.	Total value.
	Tons.	Value.	Value.	
		\$	\$	
1886				3,586
1887				3,017
1888				1,080
1889				538
1890				1,529
1891				72
1892				3,952
1893	1	38	10	48
1894	3	223		223
1895	544	4,803	30	4,833
1896	136	9,126	354	9,480
1897	205	2,988	1,337	4,325
1898	591	11,527	1,571	13,098
1899	1,237	19,326	3,164	22,490
1900	1,550	40,132	6,065	46,197
1901	1,194	30,535	4,567	35,102
1902	886	23,097	1,742	24,839
1903	412	26,230	17,412	43,642
1904	177	9,609	6,958	16,567
1905	254	7,596	518	8,114
1906	106	2,468	5,274	7,742
1907	121	3,036	2,847	5,883
1908	385	10,158	876	11,034
1909	1,004	52,438	864	53,302
1910	788	53,008	66,658	119,666
1911	813	43,249	33,956	77,205

Statistics of imports of graphite into Canada, given in Table 3, show an importation principally of manufactured graphite products, to a value of \$111,869 during the fiscal year 1911, and a valuation of \$99,997 during the previous fiscal year.

The imports of graphite during the calendar year 1911 were valued at \$112,946, and comprised: plumbago, not ground, \$4,940; black lead, \$14,172; plumbago, ground, and manufactures, \$37,042; and crucibles, clay or plumbago, \$56,814.

The imports of graphite during the calendar year 1910 were valued at \$112,853, and comprised: plumbago, not ground, \$4,867; black lead, \$10,048; plumbago, ground, and manufactures, \$45,042; and crucibles, clay or plumbago, \$52,896.

GRAPHITE.—TABLE 3.

## Imports of Raw and Manufactured Graphite.

Fiscal Year.	Plumbago not ground.	Black lead.	Ground and manufactures.	Crucibles, clay or plumbago.	Total.
	\$	\$	\$	\$	\$
1880.....	1,677	18,055	2,738		22,470
1881.....	2,479	26,544	1,202		30,225
1882.....	1,028	25,132	2,181		28,341
1883.....	3,147	21,151	2,141		26,439
1884.....	2,891	24,002	2,152		29,045
1885.....	3,729	24,487	2,805		31,021
1886.....	5,522	23,211	1,408		30,141
1887.....	4,020	25,766	2,830		32,616
1888.....	3,802	7,824	22,604		34,230
1889.....	3,546	11,852	21,789		37,187
1890.....	3,441	10,276	26,605		40,322
1891.....	7,217	8,292	26,201		41,710
1892.....	2,988	13,560	23,085		39,633
1893.....	3,293	15,595	23,051		42,939
1894.....	2,177	17,614	15,196	1,490	36,477
1895.....	2,586	13,922	16,361	5,627	38,496
1896.....	2,865	18,434	12,090	7,407	40,796
1897.....	1,406	17,863	14,768	5,906	39,943
1898.....	1,862	19,638	20,120	12,533	54,153
1899.....	4,979	21,334	22,140	14,350	62,803
1900.....	4,437	22,078	17,869	20,571	64,955
1901.....	2,357	25,646	11,016	38,874	77,893
1902.....	3,649	20,467	15,021	28,635	67,772
1903.....	2,870	22,559	12,493	34,624	72,546
1904.....	1,802	26,053	12,737	28,773	69,365
1905.....	2,499	30,743	13,192	31,353	77,787
1906.....	2,791	33,907	19,058	32,950	88,706
1907 (9 mos.).....	3,176	16,646	13,740	27,271	60,833
1908.....	3,030	9,042	31,428	40,092	83,592
1909.....	1,408	11,009	26,918	37,213	76,548
1910.....	5,223	11,930	39,815	43,029	99,997
1911.....	4,300	10,728	43,733	53,108	111,869

The market for graphite in Great Britain is to some extent indicated by the imports into that country which are shown as follows:—

Imports of Plumbago into Great Britain,<sup>1</sup> 1910 and 1911.

	1910.			1911.		
	Tons (short.)	Value.	Value per ton.	Tons (short.)	Value.	Per ton.
		\$	\$		\$	\$
Germany.....	2,989	109,636	36·7	3,020	119,301	39·5
France.....	462	46,394	100·4	1,209	116,795	96·6
Italy.....	1,034	20,328	19·3	986	18,523	18·8
Austria-Hungary.....	381	17,053	44·7	226	9,193	40·7
Japan.....	3,615	95,801	26·5	2,893	79,015	27·3
United States.....	476	53,392	112·2	284	29,677	104·5
Other foreign countries.....	339	11,967	36·3	823	32,826	39·9
British India.....	2,035	127,288	62·6	1,827	104,336	57·1
Ceylon and dependencies..	6,837	577,420	84·5	6,426	598,746	95·8
Australia.....	18	3,407	189·2	16	720	45·0
Canada.....	138	18,620	134·9	76	7,388	97·2
Other British possessions..	8	306	38·2	11	448	40·7
Total.....	18,352	1,081,612	58·9	17,797	1,116,968	62·7

<sup>1</sup> British Trade Report, 1911.

Prices of refined graphite in London, as quoted in the "Mining Journal" of December, 1911, were as follows:—

## PURIFIED MILLED AND GROUND.

Ceylon,	97 to 99 per cent	£59 to £63 per ton f. o. b. London.
"	90 to 91 "	40 to 42 " "
"	80 to 81 "	30 to 32 " "
"	70 to 71 "	27 to 28 " "
American, large flake,		45 to 49 " "
" small "		35 to 45 " "

Following is a list of the principal firms operating graphite mines:—

Operator.	Location of mine.	Address.
Graphite Limited.....	Anherst Tp., Que.....	Montreal, Que., Board of Trade Bldg.
The Bell Graphite Co., Ltd....	Buckingham Tp., Que.....	Buckingham, Que., Box 185.
Buckingham Graphite Co., Ltd.	" " .....	Buckingham, Que.
Dominion Graphite Co., Ltd...	" " .....	Toronto, 7 & 9 King St., East.
Peerless Graphite Co.....	" " .....	Rochester, N. Y., 205 Main West.
The Canadian Graphite Co., Ltd.	Wentworth Tp., Que.....	Montreal, Que., 207 Coristine Bldg.
Black Donald Graphite Co., Ltd.....	Brougham Tp., Ont.....	Calabogie, Ont.
Globe Refining Co.....	N. Burgess Tp., Ont.....	Ottawa, Ont., 175 Cooper St.
The Virginia Graphite Co.....	Monmouth Tp., Ont.....	Wilberforce, Ont.
The Black Prince Graphite Mining Co.....	Renfrew Co., Ont.....	Ottawa, 'Citizen' Bldg.

**ARTIFICIAL GRAPHITE.**

The manufacture of artificial graphite in electric furnaces has been carried on for some years at Niagara Falls, New York, by the International Atcheson Graphite Company. A plant has also been established on the Canadian side of the river, and the production of artificial graphite, during 1911, is reported as 2,172,098 pounds, as compared with 2,442,166 pounds in 1910 and 513,436 pounds in 1909.



## GYPSUM.

Gypsum has been extensively quarried or mined for many years in the Provinces of Nova Scotia and New Brunswick and to a lesser extent in the Province of Ontario. During the past twelve years the gypsum deposits north of Lake St. Martin, Manitoba, have been operated with a growing annual production. The existence of several gypsum deposits in British Columbia has been known for some years, and in 1911 some development work was done and the first shipments made.

The total shipments of gypsum products in 1911, including crude, ground, and calcined gypsum, were 518,383 tons, valued at \$993,394, as compared with 525,246 tons, valued at \$934,446, in 1910, a slight decrease in quantity, and an increase of 6 per cent in total value.

The total quantity of crude gypsum mined in 1911 was 515,979 tons, as compared with 548,019 tons in 1910. The quantity calcined in 1911 was reported as 76,718 tons, compared with 69,889 tons in 1910. The total shipments in 1911 included 449,823 tons of crude gypsum, valued at \$481,077, or an average value of \$1.07 per ton; 7,149 tons of ground gypsum, valued at \$23,125, or an average value of \$3.23 per ton; and 61,411 tons of calcined gypsum, valued at \$489,192, or an average value of \$7.97 per ton. The total shipments in 1910 included 469,573 tons of crude gypsum, valued at \$508,686, or an average value of \$1.08 per ton; 6,121 tons of ground gypsum, valued at \$17,390, or an average of \$2.84 per ton; and 49,552 tons of calcined gypsum, valued at \$408,370, or an average value of \$8.24 per ton.

The total quantity of gypsum mined and the total quantity calcined during the past seven years are shown hereunder.

Year.	Total gypsum mined.	Gypsum calcined.
	Tons.	Tons.
1905.....	443,569	26,855
1906.....	492,759	28,831
1907.....	489,962	34,752
1908.....	375,444	48,727
1909.....	493,086	63,670
1910.....	548,019	69,889
1911.....	515,979	76,718

A very large part of the gypsum mined is shipped in lump form as quarried to calcining mills in the United States. From 8,000 to 10,000 tons are ground for use as land plaster, etc., while the balance, nearly 15 per cent, in 1911, is calcined in Canada for the manufacture of plaster of Paris, wall plaster, and other products. Crude gypsum is also used in the manufacture of Portland cement.



The United States tariff on gypsum was reduced in August, 1909, that on crude gypsum from 50 cents a ton to 30 cents a ton, and on ground or calcined gypsum from \$2.25 per ton to \$1.75 per ton.

The present United States tariff on gypsum and gypsum products is defined in the following clause:—

“Plaster rock or gypsum, crude, thirty cents per ton; if ground or calcined, one dollar and seventy-five cents per ton; pearl hardening for paper makers’ use, twenty per centum ad valorem; Keen’s cement or other cement of which gypsum is the component material of chief value; if valued at ten dollars per ton or less, three dollars and fifty cents per ton; if valued above ten dollars and not above fifteen dollars per ton, five dollars per ton; if valued above fifteen and not above thirty dollars per ton, ten dollars per ton; if valued above thirty dollars per ton, fourteen dollars per ton.”

Detailed statistics of the production and sales of crude, crude ground, and calcined gypsum, during the past seven years, are shown in Table 1; while the total annual sales of gypsum products since 1886, are shown in Table 2, and the sales by provinces in Table 3.

GYPSUM.—TABLE 1.

## Sales and Shipments of Crude, Ground, and Calcined Gypsum, 1905-1911.

Calendar Year.	CRUDE (LUMP).			CRUDE GROUND.		
	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
		\$	\$ cts.		\$	\$ cts.
1905.....	412,155	409,146	0 99	3,255	8,779	2 70
1906.....	442,132	473,960	1 07	3,195	9,823	3 07
1907.....	454,668	473,831	1 04	6,732	16,268	2 42
1908.....	298,188	307,532	1 03	9,504	25,468	2 68
1909.....	423,474	457,038	1 08	8,814	26,159	2 97
1910.....	469,573	508,686	1 08	6,121	17,390	2 84
1911.....	449,823	481,077	1 07	7,149	23,125	3 23

Calendar Year.	CALCINED.			TOTAL SALES.		
	Tons.	Value.	Per ton.	Tons.	Value	Per ton.
		\$	\$ cts.		\$	\$ cts.
1905.....	26,748	168,243	6 29	442,158	586,168	1 32
1906.....	23,695	159,511	6 73	469,022	643,294	1 37
1907.....	24,521	156,815	6 40	485,921	646,914	1 33
1908.....	33,272	242,701	7 29	340,964	575,701	1 69
1909.....	40,841	326,435	7 99	473,129	809,632	1 71
1910.....	49,552	408,370	8 24	525,246	934,446	1 78
1911.....	61,411	489,192	7 97	518,383	993,394	1 92

## GYPSUM.—TABLE 2.

## Annual Production of Gypsum Products.

Calendar Year.	Tons.	Value.	Per ton.	Calendar Year.	Tons	Value.	Per ton.
		\$	\$ cts.			\$	\$ cts.
1886.....	162,000	178,742	1 10	1899.....	244,566	257,329	1 05
1887.....	154,008	157,277	1 02	1900.....	252,101	259,009	1 02
1888.....	175,887	179,393	1 01	1901.....	293,799	340,148	1 16
1889.....	213,273	205,108	0 96	1902.....	333,599	379,479	1 14
1890.....	226,509	194,033	0 86	1903.....	314,489	388,459	1 24
1891.....	203,605	206,251	1 01	1904.....	345,961	373,474	1 08
1892.....	241,048	241,127	1 00	1905.....	442,153	586,168	1 32
1893.....	192,568	196,150	1 02	1906.....	469,022	643,294	1 37
1894.....	223,631	202,031	0 90	1907.....	485,921	646,914	1 33
1895.....	226,178	202,608	0 89	1908.....	340,964	575,701	1 69
1896.....	207,032	178,061	0 86	1909.....	473,129	809,632	1 71
1897.....	239,691	244,531	1 02	1910.....	525,246	934,446	1 78
1898.....	219,256	232,515	1 06	1911.....	518,383	993,394	1 92

## GYPSUM.—TABLE 3.

## Annual Production by Provinces.

Calendar Year.	NOVA SCOTIA.		NEW BRUNSWICK.		ONTARIO.		MANITOBA.		BR. COLUMBIA.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$		\$		\$
1887....	116,346	116,346	29,102	29,216	8,560	11,715				
1888....	124,818	120,429	44,369	48,764	6,700	10,200				
1889....	165,025	142,850	40,866	49,130	7,382	13,128				
1890....	181,285	154,972	39,024	30,986	6,200	8,075				
1891....	161,934	153,955	36,011	33,996	5,660	18,300				
1892....	197,019	170,021	39,709	65,707	4,320	5,399				
1893....	152,754	144,111	36,916	41,846	2,898	10,193				
1894....	168,300	147,644	52,962	48,200	2,369	6,187				
1895....	156,809	133,929	66,949	63,839	2,420	4,840				
1896....	136,590	111,251	67,137	59,024	3,305	7,786				
1897....	155,572	121,754	82,658	118,116	1,461	4,661				
1898....	132,086	106,610	86,083	121,704	1,087	4,201				
1899....	126,754	102,055	116,792	151,296	1,020	3,978				
1900....	138,712	108,828	112,294	145,850	1,095	4,331				
1901....	170,100	136,947	121,595	189,709	1,504	5,692	600	7,800		
1902....	206,087	181,425	124,041	170,153	1,917	7,699	1,554	20,202		
1903....	189,427	173,881	119,182	172,080	2,720	21,988	3,160	20,510		
1904....	218,580	193,600	190,991	187,524	2,390	18,350	4,000	14,000		
1905....	272,252	298,248	163,553	232,586	1,853	23,834	4,500	31,500		
1906....	333,312	345,414	131,246	250,960	2,965	24,420	3,200	22,500		
1907....	357,411	380,859	118,106	213,638	10,404	52,417				
1908....	234,455	230,433	81,620	191,312	10,389	42,456	14,500	111,500		
1909....	345,682	364,379	98,716	226,975	11,731	48,278	17,000	170,000		
1910....	400,455	458,638	90,236	213,579	15,055	67,229	19,500	195,000		
1911....	353,999	406,459	93,205	115,044	27,399	98,018	43,000	372,000	780	1,875

*Exports and Imports.*—Statistics of exports and imports of gypsum as compiled from the Reports of Trade and Navigation are shown in Tables 4, 5, and 6. The exports of gypsum during the calendar year 1911 were 362,102 tons valued at \$425,161, or an average value of \$1.17 per ton, as compared with exports of 346,081 tons, valued at \$416,725, or an average of \$1.15 per ton, in 1910.

There was also an export of ground gypsum in 1911 valued at \$4,429, as compared with an export valued at \$12,306 in 1910. The exports of crude gypsum since 1874 are shown in Table 4 and of ground gypsum since 1890 in Table 5.

The imports of gypsum during the calendar year 1911 totalled 32,234 tons, valued at \$205,782, and included: crude gypsum 2,035 tons, valued at \$11,792, or \$5.79 per ton; ground gypsum 1,681 tons, valued at \$3,619, or \$2.15 per ton; and plaster of Paris 28,518 tons, valued at \$190,371, or \$6.68 per ton.

The imports during the calendar year 1910 totalled 38,006 tons, valued at \$169,798, and included: crude gypsum, 12,271 tons, valued at \$21,073, or \$1.72 per ton; ground gypsum, 6,690 tons, valued at \$13,242, or \$1.98 per ton, and plaster of Paris, 19,045 tons, valued at \$135,483, or \$7.11 per ton. The record given in Table 6 covers the fiscal year.

The imports of gypsum previous to 1905 were comparatively small; since that year, however, the imports, particularly of plaster of Paris, have increased considerably. During the past six years the imports of plaster of Paris have increased from 6,000 tons to 28,500 tons per annum, whereas formerly the imports ranged from 150 to 720 tons annually. The imports classed as "crude" and "ground" have varied considerably, not only in quantity but also in grade of product judging by the difference in average values.

GYPSUM.—TABLE 4.  
Exports of Crude Gypsum.

Calendar Year.	NOVA SCOTIA.		NEW BRUNSWICK.		ONTARIO.		TOTAL.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$		\$
1874.....	67,830	68,164					67,830	68,164
1875.....	86,065	86,193	5,420	5,420			91,485	91,613
1876.....	87,720	87,590	4,925	6,616	120	180	92,765	94,386
1877.....	106,950	93,867	5,030	5,030			111,980	98,897
1878.....	88,631	76,695	16,335	16,435	489	675	105,455	93,805
1879.....	95,623	71,353	8,791	8,791	579	720	104,993	80,864
1880.....	125,685	111,833	10,375	10,987	875	1,240	136,935	124,060
1881.....	110,303	100,284	10,310	15,025	657	1,040	121,270	116,349
1882.....	133,426	121,070	15,597	24,581	1,249	1,946	150,272	147,597
1883.....	145,448	132,834	20,242	35,557	462	837	166,152	169,228
1884.....	107,653	100,446	21,800	32,751	688	1,254	130,141	134,451
1885.....	81,887	77,898	15,140	27,730	525	787	97,552	106,415
1886.....	118,985	114,116	23,498	40,559	350	538	142,833	155,213
1887.....	112,557	106,910	19,942	39,295	225	337	132,724	146,542
1888.....	124,818	120,429	20	50	670	910	125,508	121,389
1889.....	146,204	142,850	31,495	50,862	483	692	178,182	194,404
1890.....	145,452	139,707	30,034	52,291	205	256	175,691	192,254
1891.....	143,770	140,438	27,536	41,350	5	7	171,311	181,795
1892.....	162,372	157,463	27,488	43,623			189,860	201,086
1893.....	132,131	122,556	30,061	36,706			162,192	159,262
1894.....	119,569	111,586	40,843	46,538			160,412	158,124
1895.....	133,369	125,651	56,117	67,593			189,486	193,244
1896.....	115,331	109,054	64,946	77,535			181,277	186,589
1897.....	122,984	116,665	66,222	80,485			189,206	197,150
1898.....	99,215	93,474	70,399	81,433			169,614	174,907
1899.....	104,795	99,984	96,831	108,094	* $\frac{1}{2}$	12	201,626	208,090
1900.....							188,262	201,912
1901.....							236,247	231,594
1902.....							289,600	295,215
1903.....							287,496	311,580
1904.....							298,211	316,436
1905.....							359,246	388,474
1906.....							404,464	462,814
1907.....							375,026	424,794
1908.....							280,091	324,574
1909.....							315,201	372,286
1910.....							346,081	416,725
1911.....							362,102	425,161

\* Exported from British Columbia.

GYPSUM.—TABLE 5.  
Exports of Ground Gypsum.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1890.....	105	1898.....	6,448	1905.....	2,673
1891.....	588	1899.....	8,123	1906.....	2,934
1892.....	20,255	1900.....	19,834	1907.....	557
1893.....	22,132	1901.....	15,337	1908.....	9,765
1894.....	20,054	1902.....	5,101	1909.....	2,787
1895.....	22,233	1903.....	12,457	1910.....	12,306
1896.....	21,267	1904.....	2,333	1911.....	4,429
1897.....	6,763				



GYPSUM.—TABLE 6.

## Imports of Gypsum.

Fiscal Year.	CRUDE GYPSUM.		GROUND GYPSUM.		PLASTER OF PARIS.	
	Tons.	Value.	Lbs.	Value.	Lbs.	Value.
		\$		\$		\$
1880.....	1,854	3,203	1,606,578	5,948	667,676	2,376
1881.....	1,731	3,442	1,544,714	4,676	574,006	2,864
1882.....	2,132	3,761	759,460	2,576	751,147	4,184
1883.....	1,384	3,001	1,017,905	2,579	1,448,650	7,867
1884.....		3,416	687,432	1,936	782,920	5,226
1885.....	1,353	2,354	461,400	1,177	689,521	4,809
1886.....	1,870	2,429	224,119	675	820,273	5,463
1887.....	1,557	2,492	13,266	73	594,146	4,342
1888.....	1,236	2,193	106,068	558	942,338	6,662
1889.....	1,360	2,472	74,390	372	1,173,996	8,513
1890.....	1,050	1,928	434,400	2,136	693,435	6,004
1891.....	376	640	36,500	215	1,035,605	8,412
1892.....	626	1,182	310,250	2,149	1,166,200	5,595
1893.....	496	1,014	140,830	442	552,130	3,143
1894.....		1,660	23,270	198	422,700	2,386
1895.....	603	960	20,700	88	259,200	1,619
1896.....	1,045	848	64,500	198	297,000	2,000
1897.....		772	45,000	123	969,900	4,489
1898.....	1,147	1,742	35,700	293	329,600	2,025
1899.....	325	692	33,900	338	496,300	3,120
1900.....	77	958	6,300	69	849,100	6,492
1901.....	286	1,125	65,400	1,097	502,200	3,978
1902.....	541	1,697	56,700	249	475,300	2,641
1903.....	1,076	2,187	68,700	228	630,800	3,599
1904.....	249	663	106,800	559	625,100	2,885
1905.....	2,344	7,386	2,255,700	2,681	7,924,100	37,643
1906.....	6,332	22,008	1,968,600	1,799	12,866,500	43,742
1907 (9 mos).....	9,189	23,410	609,600	1,619	19,849,400	58,364
1908.....	9,393	36,510	382,500	1,781	15,020,000	51,328
1909.....	10,317	35,268	6,286,200	5,765	17,009,000	64,849
1910.....	3,790	12,137	21,417,000	17,402	42,095,700	123,965
1911.....	12,500	22,872	13,764,300	12,298	38,562,800	135,837

Crude gypsum, duty free. Ground gypsum, duty 15 per cent. Plaster of Paris, duty 12½c. per 100 lbs.

The Province of Nova Scotia is the largest producer of gypsum. In both this Province and New Brunswick, the deposits are extensive and the facilities for water shipment to United States ports unexcelled. The total quantity of crude gypsum mined in Nova Scotia in 1911, was 337,605 tons, as compared with 438,131 tons in 1910; 357,813 tons in 1909; 254,540 tons in 1908, and 351,611 tons in 1907: of the total in 1911, about 86 per cent was mined from quarries in Hants county at Windsor, Walton, Cheverie, Noel, etc., the balance being quarried at St. Ann, Victoria county, and Cheticamp, Inverness county. The greater part of the gypsum ground was shipped crude, chiefly to United States mills. Two calcining mills were operated in the Province; one at Windsor and the other at Eastern Harbour, C.B., and the total shipments of calcined gypsum were 14,272 tons, as against 7,028 tons in 1910.



In New Brunswick the principal operating quarries are located at Hillsborough, some production being also made from the Tobique River deposits at Plaster Rock, in Victoria county. The total crude gypsum mined in the Province in 1911, was 92,446 tons, as against 97,867 tons in 1910 and 99,539 tons in 1909. About 98 per cent of the output was shipped crude, either in lump or ground, and the balance calcined, the calcined product finding a market throughout Canada.

The production of both crude and calcined gypsum was greatly reduced in New Brunswick, in 1911, owing to the unfortunate destruction by fire of the mill of the Albert Manufacturing Company at Hillsborough, the re-building of which was not completed during the year.

In Ontario, 32,148 tons were reported as having been mined during 1911, as compared with 12,021 tons in 1910. The total sales in 1911, including crude, ground, calcined gypsum, were 27,399 tons, valued at \$98,018. The sales include a quantity of alabastine manufactured by one firm, and valued at about \$50 per ton.

The production of gypsum in Manitoba has continued to increase steadily each year, and in 1911 the value of the shipments was second only to those of Nova Scotia. A second mill has been constructed in this Province by the Dominion Gypsum Company of Winnipeg, but was not placed in operation until the last month of the year. The total quantity of gypsum mined in 1911 was 53,000 tons, as against 25,000 tons in 1910, and 22,000 tons in 1909. The shipments in 1911 were 43,000 tons chiefly calcined gypsum, valued at \$372,000, as against 19,500 tons, valued at \$195,000, in 1910.

It is interesting to note that a production is reported for the first time from British Columbia, the shipments being 780 tons, valued at \$1,875. The deposits worked are situated near Merritt, B.C., and were operated by Mr. Geo. Schumacker, 703 Bower Bldg., Vancouver. The shipments were sent out as trial lots to cement works at Calgary and Blairmore, Alberta, and Tod Inlet, B.C.

It is proposed to erect a calcining plant and plaster mill in 1912.

Following is a list of the principal active operators.

Location of quarry.	Name of operator.	Address.
St. Ann, N.S.	Victoria Gypsum Mining and Mfg. Co.	Quarry, St. Ann, N.S.
Cheticamp, N.S.	Great Northern Mining and Ry. Co., Ltd.	Eastern Harbour, N.S.
Cheverie and Walton, N.S.	Albert Parsons	Walton, N.S.
Newport Station, N.S.	Windsor Gypsum Co.	Windsor, N.S.
Eagle Swamp, N.S.	Wentworth Gypsum Co., Ltd.	"
Burtens, N.S.	Windsor Plaster Co., Ltd.	"
Threemile Plains, N.S.	Nova Scotia Gypsum Co., Ltd.	Threemile Plains, N.S.
Nappan, N.S.	Maritime Gypsum Co., Ltd.	New York, 381 Fourth Ave.
Noel, N.S.	Noel Plaster Co.	Noel, N.S.
Avondale, N.S.	Newport Plaster Mining and Mfg. Co.	Windsor, N.S.
McKinnon Harbour, N.S.	Newark Plaster Co.	McKinnon Harbour, N.S.
Hillsborough, N.B.	Hillsboro Plaster Co.	Windsor, N.S.
Hillsborough, N.B.	Albert Manufacturing Co.	Hillsborough, N.B.
Tobique River, N.B.	John E. Stewart	Andover, N.B.
Plaster Rock, N.B.	The Stinson-Reeb Builders Supply Co.	Montreal, Que.
Caledonia, Ont.	Alabastine Co., Paris, Ltd.	Paris, Ont.
"	The Caledonia Gypsum Co., Ltd.	Hamilton, 501 Bk. of Hamilton Bldg.
"	Wm. Smith	Caledonia, Ont., Box 83.
Oneida, Ont.	The Crown Gypsum Co.	" " 14.
Gypsumville, Man.	Dominion "	Winnipeg, Man., 407 McArthur Bldg.
"	Manitoba " Ltd.	Winnipeg, Man.
Merritt, B.C.	Dr. Geo. Schumacher	Vancouver, B.C., 703 Bower Bldg.

## MANGANESE.

The only production of manganese reported in 1911 was that of the Nova Scotia Manganese Company at their mine at New Ross, Nova Scotia. This Company began operations in 1910 and during 1911 was engaged in the development of the mine and the construction of a mill. The only shipments made were 5½ tons of high grade pyrolusite, valued at \$300. A considerable tonnage of ore was mined and remained in stock during the year.

The manganese industry was at one time of considerable magnitude in the Provinces of Nova Scotia and New Brunswick, particularly during the decade between 1880 and 1890, the annual value of shipments ranging from \$30,000 to nearly \$50,000.

Pyrolusite or manganese peroxide is used as an oxidizer in the manufacture of chlorine, bromine, and oxygen, and of potassium ferromanganate; as a drier in paints and varnishes; as a decolorizer of glass: and in the manufacture of the dry and the Leclanche cells. As a colouring material, manganese is used in colouring glass, bricks, and pottery. Several manganese salts are used in drying cloth and as paints.

Statistics of the annual production of manganese ore are shown in Table 1, and of exports in Table 2.

The annual imports of oxide of manganese are shown in Table 3.

The exports in 1911 are reported as 4 tons, valued at \$225. The imports of manganese oxide during the calendar year 1911 were 1,924,520 pounds or 962 tons, valued at \$22,612, an average of \$23.50 per ton.

MANGANESE.—TABLE 1.  
Annual Production.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
		\$	\$ cts.			\$	\$ cts.
1886.....	1,789	41,499	23 20	1899.....	1,581	20,004	12 65
1887.....	1,245	43,658	35 07	1900.....	30	1,800	60 00
1888.....	1,801	47,944	26 62	1901*.....	440	4,820	10 95
1889.....	1,455	32,737	22 50	1902*.....	172	4,062	23 62
1890.....	1,328	32,550	24 51	1903.....	91	2,775	30 49
1891.....	255	6,694	26 25	1904.....	66	2,740	41 51
1892.....	115	10,250	89 13	1905*.....	22	1,720	78 18
1893.....	213	14,578	68 44	1906*.....	93	925	9 95
1894.....	74	4,180	56 49	1907*.....	1	22	22 00
1895.....	125	8,464	67 71	1908.....	Nil.	.....	.....
1896*.....	123½	3,975	32 19	1909.....	Nil.	.....	.....
1897*.....	15½	1,166	76 46	1910.....	Nil.	.....	.....
1898.....	50	1,600	32 00	1911.....	5½	300	54 55

\* Exports.

MANGANESE.—TABLE 2.  
Exports of Manganese Ore.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1873 .....	1,031	20,192	1893 .....	133	12,521
1874 .....	732	16,973	1894 .....	56	3,120
1875 .....	203	5,514	1895 .....	108 3	6,351
1876 .....	412	8,039	1896 .....	123 5	3,975
1877 .....	891	15,909	1897 .....	15 3	1,166
1878 .....	626	10,860	1898 .....	11	325
1879 .....	1,886	27,436	1899 .....	70	2,410
1880 .....	2,179	34,797	1900 .....	34	1,720
1881 .....	1,704	40,554	1901 .....	440	4,820
1882 .....	894	25,747	1902 .....	172	4,062
1883 .....	1,326	25,343	1903 .....	135	1,889
1884 .....	603	20,089	1904 .....	123	2,706
1885 .....	1,684	34,649	1905 .....	22	1,720
1886 .....	(a) 1,818	53,338	1906 .....	93	925
1887 .....	1,415	34,802	1907 .....	1	22
1888 .....	1,181	21,832	1908 .....		
1889 .....	1,436	29,350	1909 .....	3	434
1890 .....	1,906	36,831	1910 .....	4	160
1891 .....	255	6,694	1911 .....	4	225
1892 .....	143	8,205			

(a) 250 tons from Cornwallis should more correctly be classed under the heading of mineral pigments.

MANGANESE.—TABLE 3.  
Imports:—Oxide of Manganese.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1884 .....	3,989	258	1898 .....	130,456	5,047
1885 .....	36,778	1,794	1899 .....	141,356	5,539
1886 .....	44,967	1,753	1900 .....	126,725	4,155
1887 .....	59,655	2,933	1901 .....	272,134	8,176
1888 .....	65,014	3,022	1902 .....	476,331	5,360
1889 .....	52,241	2,182	1903 .....	279,611	8,051
1890 .....	67,452	3,192	1904 .....	275,696	7,051
1891 .....	92,087	3,743	1905 .....	235,289	6,832
1892 .....	76,097	3,530	1906 .....	244,620	5,508
1893 .....	94,116	3,696	1907 (9 mos.) .....	386,404	11,087
1894 .....	101,863	4,522	1908 .....	732,242	17,863
1895 .....	64,151	2,781	1909 .....	382,137	6,561
1896 .....	108,590	4,075	1910 .....	810,529	13,048
1897 .....	70,663	2,741	1911 .....	1,471,462	18,347

## MICA.

Mica is mined in Canada in the Provinces of Quebec and Ontario. In Quebec the deposits being worked are situated chiefly in the region to the north of the city of Ottawa, in the townships of Hull, Wakefield, Buckingham, Portland, and Templeton. The Ontario deposits being worked are included in an area lying directly east of the Kingston and Pembroke railway and are located chiefly in the townships of North Burgess and South Sherbrooke in Lanark county; South Burgess in Leeds county, and in Bedford and Loughborough in Frontenac county. Some considerable development has also been done on deposits in British Columbia, particularly at Big Bend on the Columbia river north of Donald, B.C.

These latter deposits, however, are not as yet provided with transportation facilities and consequently have not yet made any production.

Phlogopite or amber mica is the variety chiefly found and mined, although muscovite or white mica is also produced in small quantities.

The mica deposits of Canada have been the subject of a special monograph recently published by the Mines Branch.<sup>1</sup>

The total production of mica in 1911 as reported by the producers was 590 tons, valued at \$128,677, comprising 217 tons, valued at \$69,465, from the Province of Quebec, and 373 tons, valued at \$59,212, from Ontario; the average value per ton of the Quebec shipments being \$320 and of the Ontario shipments, \$158.75. In 1910, the total production was reported as 758 tons valued at \$190,385, being 316 tons, valued at \$87,295, from Quebec, and 442 tons, valued at \$103,090, from Ontario.

These statistics represent as far as possible the quantities and values of mica shipped from the mines.

It should be pointed out, however, that the condition in which the mica is shipped, varies greatly in different mines. Thus, one operator may ship his output cleaned and trimmed while another may ship his in a rough cobbled state. Some operators, also, particularly those shipping to their own trimming works, place a merely nominal value upon the product as shipped from the mine. This explains in a measure the apparent anomaly of the exports having a higher value than the production.

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<sup>1</sup> Mica, Its Occurrences, Exploitation, and Uses, by Hugh S. DeSchmid, M.E., Mines Branch, Department of Mines, 1912.



**Mica, Rough and Thumb-trimmed, Reported as Shipped during 1909 and 1910.**

Province.	1910			1911		
	Tons.	Value.	Value per ton.	Tons.	Value.	Value per ton.
		\$	\$ cts.		\$	\$ cts.
Quebec.....	316	87,295	276 25	217	69,465	320 12
Ontario.....	442	103,090	233 24	373	59,212	158 75
Total .....	758	190,385	251 17	590	128,677	218 10

MICA.—TABLE 1.  
Annual Production.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1886.....	29,008	1895.....	65,000	1903.....	177,857
1887.....	29,816	1896.....	60,000	1904.....	160,777
1888.....	30,207	1897.....	76,000	1905.....	178,235
1889.....	28,718	1898.....	118,375	1906.....	303,913
1890.....	68,074	1899.....	163,000	1907.....	312,599
1891.....	71,510	1900.....	166,000	1908.....	129,871
1892.....	104,745	1901.....	160,000	1909.....	147,782
1893.....	75,719	1902.....	135,904	1910.....	190,385
1894.....	45,581			1911.....	128,677

Table 2 following gives the exports of mica from Canada since 1887 as compiled from the reports of the Customs Department.

MICA.—TABLE 2.  
Exports.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Tons.	Value.
	\$		\$			\$
1887.....	3,480	1896.....	47,756	1904.....		198,482
1888.....	23,563	1897.....	69,101	1905.....		179,049
1889.....	30,597	1898.....	110,507	1906.....	912	581,919
1890.....	22,468	1899.....	158,002	1907.....	558	422,172
1891.....	37,590	1900.....	146,750	1908.....	290	198,839
1892.....	86,562	1901.....	152,553	1909.....	359	256,834
1893.....	70,081	1902.....	391,812	1910.....	469	330,903
1894.....	38,971	1903.....	196,020	1911.....	347	242,548
1895.....	48,525					

The destination of exports during the calendar years 1909, 1910, and 1911, was as follows: showing that United States continues to be the chief market for Canada's mica.

	1909		1910		1911	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
To Great Britain.....	31	24,316	87	37,787	67	53,203
To United States.....	325	229,689	378	291,533	278	188,201
To other countries.....	3	2,829	4	1,583	2	1,144
Total.....	359	256,834	469	330,903	347	242,548

For the purpose of illustrating the relative importance of the imports of Canadian mica into the United States, as compared with those from other countries which also supply part of the mica consumed in that country, the following table is given, while the market available in Great Britain is indicated by the statistics given in Table 4.

MICA.—TABLE 3.  
Imports of Mica into the United States.<sup>1</sup>

Year ending June 30.	IMPORTS FROM CANADA.		TOTAL IMPORTS FROM ALL COUNTRIES.	
	Short Tons.	Value.	Short Tons.	Value.
		\$		\$
1895.....	273	39,637	410	127,515
1896.....	310	57,908	632	214,997
1897.....	208	54,630	441	187,845
1898.....	233	53,854	313	94,294
1899.....	512	131,310	808	259,228
1900.....	549	136,981	1,019	314,882
1901.....	484	161,741	1,011	369,644
1902.....	427	184,287	903	384,818
1903.....	417	196,470	973	414,953
1904.....	287	137,191	693	306,937
1905.....	253	121,560	594	296,362
1906.....	539	328,991	1,206	731,484
1907.....	767	596,321	1,724	1,295,606
1908.....	172	140,166	655	567,550
1909.....	167	132,941	403	313,525
1910.....	434	333,196	1,008	682,539
1911.....	316	239,964	872	612,936

<sup>1</sup> The Foreign Commerce and Navigation of the United States.

MICA.—TABLE 4.

## Imports of Mica into Great Britain.\*

	1909		1910		1911	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
		\$		\$		\$
Germany.....	75,264	13,349	131,152	22,333	108,752	20,294
German East Africa.....	68,320	15,009	10,864	1,859		
United States.....	142,352	9,441	216,832	18,255	183,456	8,658
Brazil.....	4,032	793	224	212		
Other foreign countries..	22,848	4,804	112,560	20,727	141,904	25,501
British India.....	2,604,224	480,700	2,513,056	453,685	2,889,152	496,410
Canada.....	67,424	30,791	152,992	49,566	119,168	39,561
Other British possessions	2,352	886	10,976	2,910	4,368	1,012
Total.....	2,986,816	555,773	3,148,656	569,449	3,446,800	591,436

\* British Trade Report.

Following is a list of the principal firms engaged in mica mining:—

Operator.	Location of mine.	Address.
<i>Ontario:—</i>		
Kent Bros. & J. Stoness.....	Frontenac Co., Bedford Tp.....	Kingston.
H. & C. Campbell.....	" ".....	Perth Road.
S. H. Orser.....	" ".....	"
J. W. Trousdale.....	Loughboro Tp.....	Sydenham.
Kingston Feldspar and Mining Co., Ltd.....	" ".....	Kingston.
The Loughboro Mining Co., Ltd.	" ".....	Sydenham.
Scriven and Whyte.....	" ".....	"
Wood, Solliday, and Freeman...	" ".....	"
The Birch Lake Mining Co.....	" ".....	"
Sewell & Smith.....	Lanark Co., Burgess Tp.....	Micaville.
Dominion Improvement & Development Co.....	" ".....	Perth, Box 26.
R. McConnell.....	" ".....	Ottawa.
W. L. McLaren.....	" ".....	Perth.
John Mahon.....	" ".....	Rideau Ferry.
Thompson, Donnelly, & Gemmill.	" ".....	Perth.
Brockville Mining Co., Ltd.....	Leeds Co., S. Crosby Tp.....	Brockville.
<i>Quebec:—</i>		
W. Argall.....	Argenteuil Co., Wentworth Tp...	Laurel.
W. L. Parker.....	Labelle Co., Bigelow Tp.....	Buckingham.
Wm. Cleland.....	Ottawa Co., Cameron Tp.....	Bouchette.
Emile Joanis.....	" Egan Tp.....	Maniwaki.
Vavasour Mining Association...	" Hull Tp.....	Ottawa, Ont.
American Mica and Phosphate Co.....	" ".....	Minneapolis, 242 Temple Court.
R. J. McGlashan.....	" Wakefield Tp.....	Wilson Corners.
Henry T. Flynn.....	" Hull and Cameron Tps.....	Hull.
Kent Bros.....	" Hull and Wright Tps.....	Kingston, Ont.
R. McConnell.....	" ".....	Ottawa, Ont.
O'Brien & Fowler (B. Winning)..	" E. Portland Tp.....	Cummings Bridge, Ont.
John Stewart.....	" Portland W. Tp.....	East Templeton
Mine Products, Ltd.....	" ".....	Toronto, Ont. 4 Richmond E.
Blackburn Bros.....	" Templeton Tp.....	Ottawa, Ont.
Wallingford Mica and Mining Co	" ".....	"
Wallingford Bros., Ltd.....	" ".....	"
Laurentide Mica Co., Ltd.....	" ".....	Hull.
Thos. J. Waters.....	" ".....	Ottawa, 155 Stewart St.
J. B. Gauthier.....	" Villeneuve Tp.....	Buckingham, Box 226.
J. B. Gorman.....	" ".....	" " 166.
<i>British Columbia:—</i>		
Big Bend Mica Mines, Ltd.....	12 miles N. of Donald, B.C.....	Calgary, Alta., 518 7th Ave., W.

## MINERAL PIGMENTS.

Under this heading is included a record of the production of ochres and barytes.

### OCHRES.

The production of ochres in 1911 included 1,622 tons, valued at \$24,333, or an average of about \$15 per ton, used for paint manufacture; and 2,000 tons, valued at \$4,000, shipped to gas works throughout Canada, a total production of 3,622 tons, valued at \$28,333. The production has varied very slightly during the past ten years.

The ochre used for the manufacture of paints is calcined and ground at the place of production, while that used for the purification of illuminating gas is shipped crude to gas companies.

Statistics of production since 1886 are shown in Table 1.

MINERAL PIGMENTS.—TABLE 1.

### Annual Production of Ochres and Iron Oxides.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	350	2,350	1899.....	3,919	20,000
1887.....	485	3,733	1900.....	1,966	15,398
1888.....	397	7,900	1901.....	2,233	16,735
1889.....	794	15,280	1902.....	4,955	30,495
1890.....	275	5,125	1903.....	6,266	32,760
1891.....	900	17,750	1904.....	3,925	24,995
1892.....	390	5,800	1905.....	5,105	34,675
1893.....	1,070	17,710	1906.....	6,758	36,125
1894.....	611	8,690	1907.....	5,828	35,570
1895.....	1,339	14,600	1908.....	4,746	30,440
1896.....	2,362	16,045	1909.....	3,940	28,093
1897.....	3,905	23,560	1910.....	4,813	33,185
1898.....	2,226	17,450	1911.....	3,622	28,333

The working of ochre deposits is practically confined in Canada to one district, situated between Champlain and Three Rivers, in the Province of Quebec, a short distance back from the shore of the St. Lawrence river.

Numerous deposits of ochre are found in the Province of Quebec, but are not worked at present. In Ontario small quantities of ochre are occasionally mined from a deposit situated near Campbellville, and during 1911 a production of 10 tons, valued at \$160, was reported.

The following are the firms which are mining ochres in Canada:—

The Canada Paint Company, Ltd., Montreal, Que.

The Champlain Oxide Company, Three Rivers, Que.

Thos. H. Argall, Three Rivers, Que.

Ontario Mineral Paint Company, Campbellville, Ont.

The exports of iron oxides in 1911 were 2,000 tons, valued at \$27,070, as against 1,746 tons, valued at \$29,839, in 1910. The imports of pigments during the calendar year 1911 were: ochres and ochrey earth, and raw siennas, 1,477 tons, valued at \$32,032; oxides, dry fillers, fireproof umbers and burnt siennas, 722 tons, valued at \$21,060, or a total value of \$53,092. During 1910 the imports of the above classes were respectively valued at \$31,926 and \$23,467, or a total value of \$55,393.

#### MINERAL PIGMENTS.—TABLE 2.

##### Imports of Ochres and Pigments.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	571,454	6,544	1896.....	1,159,494	16,954
1881.....	677,115	8,972	1897.....	1,504,044	18,504
1882.....	731,526	8,202	1898.....	2,126,592	26,307
1883.....	898,376	10,375	1899.....	2,444,698	31,092
1884.....	533,416	6,398	1900.....	2,474,537	32,017
1885.....	1,119,177	12,782	1901.....	2,092,067	27,267
1886.....	1,100,243	12,267	1902.....	2,530,743	33,909
1887.....	1,460,128	17,067	1903.....	3,215,346	42,243
1888.....	1,725,460	17,664	1904.....	2,767,580	36,636
1889.....	1,342,783	12,994	1905.....	3,122,690	35,887
1890.....	1,394,811	14,066	1906.....	4,321,530	57,397
1891.....	1,528,696	20,550	1907 (9 mos.).....	2,926,528	39,675
1892.....	1,708,645	22,908	1908.....	3,749,132	39,923
1893.....	1,968,645	23,134	1909.....	2,122,781	27,540
1894.....	1,358,326	18,951	1910.....	3,683,344	44,190
1895.....	793,258	12,048	1911.....	4,160,769	54,022

	Duty.	1910.	1911.		
		Lbs.	\$	Lbs.	\$
Ochres and ochrey earths and raw siennas.....	20 %	1,988,758	21,426	2,576,261	31,736
Oxides, dry fillers, fireproofs, umbers and burnt siennas N.E.S.....	25 %	1,694,586	22,764	1,584,508	22,286
Total.....		3,683,344	44,190	4,160,769	54,022



## MINERAL PIGMENTS.—TABLE 3.

## Exports of Mineral Pigments, Iron Oxides, etc.

Calendar Year.	Tons. *	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1897.....	512	7,706	1905.....	353	7,704
1898.....	283	4,227	1906.....	139	2,379
1899.....	308	5,408	1907.....	191	10,043
1900.....	651	7,154	1908.....	125	4,850
1901.....	401	8,233	1909.....	658	7,956
1902.....	352	6,182	1910.....	1,746	29,839
1903.....	676	12,770	1911.....	2,000	27,070
1904.....	416	7,260			

**BARYTES.**

The only production of barytes reported for 1911 was from Lake Ainslie, Cape Breton, the shipments being 50 tons, valued at \$400. This district is well known for its deposits of sulphate of barium, considerable shipments having been made in past years of the crude mineral to grinding plants at Halifax, Montreal, and New York. Properties at Scottsville and East Lake Ainslie, have been leased by Barytes Limited, under the management of Mr. H. H. Harrison, and during six months of 1911 the Company was engaged in the development of the mine and in the construction of a refining plant for the manufacture of ground barytes. The refining plant was not placed in operation until late in the year, but it is expected that a considerable tonnage will be ground during 1912. It is claimed that the product assays from 96 to 98 per cent barium sulphate.

The Bass River mine at Five Islands, Nova Scotia, was not operated during the year.

Statistics of production since 1885 are shown in Table 4, and imports in Table 5. Statistics of imports of barytes have not been separately shown by the Customs Department since 1890, but the imports of blanc fixe (artificial sulphate of barium), and satin white, during the twelve months ending March, 1910, amounted to 629 tons, valued at \$14,735, and during the twelve months ending March 1911, 1,212 tons, valued at \$26,797.

## MINERAL PIGMENTS.—TABLE 4.

## Annual Production of Barytes.

Calendar Year.	Tons.	Value.	Average Value.	Calendar Year.	Tons.	Value.	Average Value.
		\$	\$ cts.			\$	\$ cts.
1885.....	300	1,500	5 00	1899.....	720	4,402	6 11
1886.....	3,864	19,270	4 98	1900.....	1,337	7,605	5 69
1887.....	400	2,400	6 00	1901.....	653	3,842	5 89
1888.....	1,100	3,850	3 50	1902.....	1,096	3,957	3 61
1889.....				1903.....	1,163	3,931	3 38
1890.....	1,842	7,543	4 09	1904.....	1,382	3,702	2 68
1891.....				1905.....	3,360	7,590	2 23
1892.....	315	1,260	4 00	1906.....	4,000	12,000	3 00
1893.....				1907.....	1,344	3,000	2 23
1894.....	1,081	2,830	2 62	1908.....	4,312	19,021	4 41
1895.....				1909.....	179	1,120	6 26
1896.....	145	715	4 93	1910.....			
1897.....	571	2,060	5 36	1911.....	50	400	8 00
1898.....	1,125	5,533	4 92				

## MINERAL PIGMENTS.—TABLE 5.

## Imports of Barytes.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$
1880.....	2,230	1,525	1886.....		62
1881.....	3,740	1,011	1887.....	379	676
1882.....	497	303	1888.....	236	214
1883.....		185	1889.....	1,332	987
1884.....		229	1890.....	1,322	978
1885.....	7	14			

## Exports of Barytes.

Calendar Year.	Cwt.	Value.	Calendar Year.	Cwt.	Value.
		\$			\$
1901.....	208	3,820	1907.....	550	2,750
1902.....			1908.....	3,509	13,690
1903.....	406	368	1909.....		
1904.....	13,080	5,178	1910.....	5	150
1905.....	34,488	14,343	1911.....		
1906.....	1,350	6,750			

## MINERAL WATER.

The statistics of production given herewith represent, as usual, as closely as can be obtained, the value of mineral water shipped from mineral springs in bottles, barrels, or other containers, and do not include any estimate for the value of mineral water used at the spring for drinking or bathing purposes, nor are the natural pure spring waters included, of which a considerable quantity is sold in bottled form.

The value of the production in 1911 was reported as \$223,758, as compared with \$199,563 in 1910 and \$175,173 in 1909.

The imports of mineral and aerated waters during the calendar year 1911 were valued at \$229,367, as against a value of \$202,306 in 1910, and \$184,071 in 1909.

Statistics of production and imports are shown in tables following:—

MINERAL WATERS.—TABLE 1.

### Annual Production.

Calendar Year.	Gals.	Value.	Calendar Year.	Gals.	Value.	Calendar Year.	Gals.	Value.
		\$			\$			\$
1888.....	124,850	11,456	1896.....	706,372	111,736	1904.....		100,000
1889.....	424,600	37,360	1897.....	749,691	141,477	1905.....		100,000
1890.....	561,165	66,031	1898.....	555,000	100,000	1906.....		100,000
1891.....	427,485	54,268	1899.....		100,000	1907.....		136,020
1892.....	640,380	75,348	1900.....		75,000	1908.....		151,953
1893.....	725,096	108,347	1901.....		100,000	1909.....		175,173
1894.....	767,460	110,046	1902.....		100,000	1910.....		199,563
1895.....	739,382	126,048	1903.....		100,000	1911.....		223,758

MINERAL WATERS.—TABLE 2.

### Imports.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	41,797	1891.....	15,721	1902.....	91,871
1881.....	55,763	1892.....	17,913	1903.....	108,130
1882.....	57,953	1893.....	27,909	1904.....	137,304
1883.....	49,546	1894.....	28,130	1905.....	161,790
1884.....	48,613	1895.....	27,879	1906.....	178,639
1885.....	55,864	1896.....	32,674	1907 (9 months)...	143,416
1886.....	47,006	1897.....	22,142	1908.....	153,831
1887.....	52,989	1898.....	33,314	1909.....	159,221
1888.....	54,891	1899.....	38,046	1910.....	188,559
1889.....	66,331	1900.....	30,343	1911.....	202,659
1890.....	71,521	1901.....	40,802		

Following is a list of mineral water producers:—

Operator.	Location of spring.	Address.
The Havelock Mineral Spring Co. Ltd.....	Havelock Springs, N.B. ....	Havelock Springs, N.B.
The St. Leon Waters, Ltd.....	St. Leon, Que.,.....	Toronto, 12 Wellington St.
Radnor Water Co.....	Radnor Forges, Que.....	Montreal, Que.
Abenakis Mineral Springs Co., Ltd.....	Yamaska Co., Que.....	Abenakis Springs, Que.
Louis L'Heureux.....	Nancy, Que.....	Quebec, Que.
Gurd & Co., Ltd.....	Varennes, Que.....	Montreal, Que.
Caledonia Springs Co., Ltd.....	Caledonia Springs, Ont.....	"
Lyall, Trenholme & McDonnell.....	".....	Montreal West, Que.
Gurd & Co., Ltd.....	Caledonia, Ont.....	Montreal, Que., 74 Bleury.
Robert Allan.....	".....	86 Dorchester.
Thos. L. Boyd.....	Clarence, Ont.....	Toronto, Ontario.
Canada Mineral Waters, Ltd...	Carlsbad, Ont.....	Carlsbad Springs, Ont.
Arthur Belanger.....	Prescott, Ont.....	Papineauville, Que.
Beck & Frank.....	".....	Southampton, Ont.
Sanitaris Ltd.....	Pakenham, Ont.....	Arnprior, Ont.
St. Davids Mountain Spring Water Co., Ltd.....	".....	Niagara Falls South, Ont.
Stanley Mineral Springs Co., Ltd	Stanley, Ont.....	Winnipeg, Man., 410 Builders Exchange.
Halcyon Hot Springs Sanitarium	Arrow lake.....	Halcyon Hot Springs, B.C.
St. Leon Hot Springs.....	Upper Arrow lake.....	St. Leon Hot Springs, B.C.

## NATURAL GAS.

The total value of the production of natural gas in Canada in 1911 was, according to returns received, \$1,907,678, as compared with a value of \$1,346,471 in 1910, and \$1,207,029 in 1909.

The quantity used in 1911, was about 11,644,000 M feet, while in 1910, the quantity used was approximately 8,000,000 M feet, and on this basis an apparent increase in production is shown of about 46 per cent.

The value of the production in Ontario in 1911 was returned as \$1,807,513, and in Alberta, \$110,165. In 1910, the Ontario production was valued at \$1,271,303, and that of Alberta at \$75,168. In 1909, the Ontario production was valued at \$1,145,307, and that of Alberta \$61,722.

The value of the gas as reported by the producers varies from 5 cents to 30 cents per M feet, but these prices do not represent what the consumer has to pay. In some cases the producer also owns the distribution pipe line and receives the full price paid by the consumer. In other cases the producer may sell to a pipe line company who either sells directly to consumers or may in time re-sell to other pipe line companies for retail distribution; in such cases as these the producer only receives a fraction of the amount paid by the consumer, but he is saved the expense of distribution. The statistics given herewith represent as far as possible the value received by the producer or owner of the gas wells whether such producer be the owner of the distribution line or not.

The annual value of the production of natural gas is shown in Table 1.

NATURAL GAS.—TABLE 1.  
Annual Production since 1892.

Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$
1892 .....	150,000	1902 .....	195,992
1893 .....	376,233	1903 .....	202,210
1894 .....	313,754	1904 .....	328,376
1895 .....	423,032	1905 .....	379,561
1896 .....	276,301	1906 .....	583,523
1897 .....	325,873	1907 .....	815,032
1898 .....	322,123	1908 .....	1,012,660
1899 .....	387,271	1909 .....	1,207,029
1900 .....	417,094	1910 .....	1,346,471
1901 .....	339,476	1911 .....	1,907,678

Returns received showed 1,027 producing wells in Ontario, of which 244 were completed during the year. Thirty-four non-producing wells were also drilled during 1911.

In this Province the three principal producing fields are known as the Welland county, the Haldimand-Norfolk, and the Essex-Kent. The gas is used for lighting, heating, and manufacturing quite generally throughout the



district in which it is available. Formerly considerable quantities of gas were exported to Detroit and Buffalo, adjacent respectively to the Essex and Welland fields, but this export has now ceased. Under the provisions of Chap. 16, 6-7 Edward VII, entitled; 'An Act to regulate the exportation of electric power and certain liquids and gases,' assented to April 27, 1907, the export of natural gas is prohibited except under special license issued by the Governor in Council.

In order to conserve the supply of natural gas, and as far as possible prevent its waste, the Ontario Legislature in 1908, passed an 'Act to prevent the wasting of natural gas and to provide for the plugging of all abandoned wells' (Edward VII, Chapter 47), by which power was conferred upon inspectors appointed under the Act, to enforce the stopping of waste. The Supplementary Revenue Act, 1907 (Ontario Statutes), also contained provisions which have been even more effective than those of the first mentioned Act, and the enforcement of these laws has, according to the Bureau of Mines, reduced the waste of gas to a minimum.

Gas is supplied in about 56 different towns and villages as well as generally to consumers in a number of townships.

The commercial use of gas in Alberta has hitherto been confined largely to Medicine Hat and vicinity, although the existence of natural gas in large quantities has been demonstrated in widely separated localities.

In Medicine Hat the city now has five deep producing wells in addition to a number of shallow wells not in use. Also one 10" well drilled by the city has been turned over to the Alberta Rolling Mills. The city wells are about 1,000 feet in depth and have a rock pressure of about 550 pounds. The Gas Superintendent reports that the gas shows no diminution in pressure and is perfectly dry. The Canadian Pacific railway has one well at Medicine Hat and one at Suffield, 26 miles west on the main line.

At Redcliff, 6 miles west of Medicine Hat, there are three wells, one owned by the Redcliff Brick & Coal Co., Ltd., and two by the Redcliff Realty Co. The Purmal Brick Company has also one well on section 28 of the Medicine Hat district.

The wells put down by the Canadian Pacific railway at Dunmore Junction, Brooks, Bassano, and Bow Island, together with the well at Calgary owned by the Calgary Natural Gas Co., Ltd., have been taken over by the Canadian Western Natural Gas, Light, Heat & Power Company of Calgary, of which Mr. Eugene Coste is President and Managing Director. The most important wells are those at Bow Island, the rock pressures in which average 800 pounds to the square inch in each well. At the end of March 1912 this Company had 9 wells at Bow Island with a total daily capacity of about 106,000,000 cubic feet. The Company will supply natural gas extensively throughout southern Alberta and is now engaged in the construction of a 16" pipe line, 170 miles long, from the Bow Island field to Calgary, and on branch lines and distributing systems to Lethbridge, McLeod, Granum, Claresholm, Nanton, High River, Okotoks, and other towns and villages in southern Alberta and expects to turn on gas at Calgary on or about September 1, 1912.

Drilling was also being done at Tofield, near Edmonton, in which it has been reported that gas has recently been struck.

Natural gas rights in Manitoba, Saskatchewan, Alberta, the Northwest Territories, the Yukon, etc., are the property of the Crown, and their disposal is now subject to the regulations approved by Order in Council dated the 11th day of March, 1910.

These regulations provide for a rental of 25 cents an acre for the first year and 50 cents an acre each subsequent year, lease to be for twenty-one years, renewable on conditions, and no applicant to be allowed to lease the gas rights under an area of more than 1,920 acres.

In New Brunswick no gas was sold during the year but gas has been used entirely for power for drilling purposes by the Maritime Oilfields, Ltd., who continued drilling operations in the Albert County district. This Company completed 7 wells during the year, of which 4 were producing gas wells, 2 oil wells, and 1 dry well, and has now a total of 17 producing gas wells with a daily flow of over 58,000,000 cubic feet. A pipe line has been laid to Moncton and it is expected that natural gas will shortly be supplied to that city.

The following is a list of the principal firms operating natural gas wells:—

Operator.	Location of wells.	Address.
<i>New Brunswick—</i>		
Maritime Oil Fields, Ltd.,.....	Albert Co., Stony Creek Dist.....	Moncton, Box 196.
<i>Ontario—</i>		
Provincial Natural Gas Co.,.....	Welland Co.....	Niagara Falls.
Bertie Natural Gas Co.,.....	" Bertie Tp.....	Ridgeway.
The United Gas Companies, Ltd.,...	" Wainfleet Tp.....	St. Catharines.
Welland Co. Lime Works Co., Ltd.,	" ".....	Port Colborne.
The Canadian Steel Foundries, Ltd	" Crowland and Humberstone	Welland.
Sterling Gas Co., Ltd.,.....	" Tps.....	
The Port Colborne Welland Natural	" Humberstone Tp.....	Port Colborne.
Gas Co.,.....	Haldimand Co. Oneida and Caledonia Tps	"
Producers Natural Gas Co., Ltd.,...	" Rainham and Walpole	Hamilton.
Canboro Natural Gas Co., Ltd.,....	" Tps.....	
Dominion Natural Gas Co., Ltd.,...	" Canboro Tp.....	Canboro.
Selkirk Gas & Oil Co., Ltd.,.....	" and Norfolk Co.....	Pittsburgh.
The Cheapside Gas Co.,.....	" Rainham Tp.....	Farmers Bk. Bldg.
The Fisherville Gas Co.,.....	" Cheapside Tp.....	Selkirk.
The Holmes Gas Co.,.....	" ".....	Cheapside.
David E. Hoover,.....	" Rainham and Walpole	"
Jas. H. Hoover,.....	" Tps.....	Selkirk.
Wainess & Root,.....	" ".....	"
Alfred Lamb,.....	" Walpole Tp.....	Dunnville.
Walter B. Lamb,.....	" ".....	Selkirk.
Aldrich Gas & Oil Co., Ltd.,.....	" ".....	Nanticoke.
Midfield Natural Gas Co.,.....	" ".....	Selkirk.
Nanticoke Natural Gas Co., Ltd.,...	" N. Cayuga Tp.....	Hamilton.
The Volcanic Oil & Gas Co., Ltd.,...	" Walpole Tp.....	Nanticoke.
The Canadian Gas Co., Ltd.,.....	Kent Co. E. Tilbury and Romney Tp...	Niagara Falls.
Beaver Oil & Gas Co., Ltd.,.....	" Mersea Tp.....	Detroit, 1309.
Aikins, Lalor & Beck,.....	" " and Romney Tps.....	Ford Bldg.
Maple City Oil & Gas Co., Ltd.,...	Brant, S. Cayuga.....	Brantford.
Ridgetown Fuel Supply Co., Ltd.,...	Kent Co. E. Tilbury Tp.....	Chatham.
	" Raleigh Tp.....	Ridgetown.

Operator.	Location of wells.	Address.
The United Fuel Supply Co., Ltd. ....	Kent Co., Tilbury E. ....	Sarnia.
The North Shore Gas Co., Ltd. ....	Haldimand Co. ....	Hamilton.
The Medina Natural Gas Co., Ltd. ....	Elgin and Norfolk Co. ....	Niagara Falls.
The Onondaga Oil & Gas Co., Ltd. ....	Brant Co., Onondaga Tp. ....	Brantford.
Standard Natural Gas Co., Ltd. ....	Kent Co. and Brant Co. ....	"
Oxford Oil & Gas Co., Ltd. ....	Oxford Co. E. Zorra Tp. ....	"
<i>Alberta—</i>		
City of Medicine Hat Gas Commission. ....	City of Medicine Hat ....	Medicine Hat.
Redcliff Brick Co. ....	Redcliff. ....	Redcliff.
Canadian Pacific Railway. ....	Medicine-Hat, Suffield. ....	
	Dunmore Junction. ....	
The Canadian Western Nat. Gas, Light, Heat & Power Co., Ltd. ....	Bow Island, Brooks. ....	Calgary, 128-7th Ave.
	Bassano. ....	
The Redcliff Realty Co. ....	Redcliff. ....	Redcliff.
The Puralm Brick Co., Ltd. ....	Medicine Hat. ....	Medicine Hat.
The Alberta Rolling Mills. ....	Medicine Hat. ....	"

## PEAT.

Peat fuel was produced in Canada during 1911 from three bogs, viz.: one at Alfred, Prescott county, Ontario, operated by the Dominion Department of Mines as an experimental or demonstration plant; one near London, Ont., operated by the Dorchester Peat Fuel Co., under the management of J. McWilliams; and one near Farnham, Que., operated by Peat Industries, Ltd., of Montreal.

The total shipments in 1911 were 1,463 tons, valued at \$3,817, as compared with shipments, in 1910, of 841 tons, valued at \$2,604.

Part of the product of the Alfred bog was used in the Department's fuel testing station<sup>1</sup> in Ottawa, and the surplus or balance was sold chiefly in Ottawa, where the limited supply was greatly in demand having proven an excellent fuel, particularly for grates and cook stoves. The peat was excavated at the bog with an Anrep machine, cut into blocks on the ground and air dried.

Only a small production was made at the London and Farnham bogs. At London the greater part of the season was spent in testing two steam dryers and in putting in a permanent one which will be operating during 1912. The Farnham bog was operated for a short time only during the season. An Anrep machine equipped with an automatic excavating device was used at this bog.

The annual production of peat during the past 12 years is shown below:—

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1900.....	400	\$1,200	1906.....	474	\$1,422
1901.....	220	600	1907.....	50	200
1902.....	475	1,663	1908.....	60	180
1903.....	1,100	3,300	1909.....	60	240
1904.....	800	2,400	1910.....	841	2,604
1905.....	80	260	1911.....	1,463	3,817

<sup>1</sup> Results of the testing of this peat are shown in the 'Report on the Utilization of Peat Fuel or the Production of Power' by B. F. Haanel, B. Sc., Mines Branch publication, No. 154.



## PETROLEUM.

The petroleum industry in Canada has been marked during the past four years by a rapidly decreasing output, the production in 1911 being only a little more than one-third that of 1907. The total production of crude petroleum in 1911 was 291,092 barrels of 35 imperial gallons each, valued at \$357,073 or an average of \$1.22½ per barrel, as compared with a production of 315,895 barrels valued at \$388,550 or an average of \$1.23 per barrel in 1910, and 420,755 barrels, valued at \$559,604, or an average of \$1.33 per barrel in 1909. With the exception of 86,139 gallons in 1911, 51,975 gallons in 1910, and 3,328 gallons in 1909, produced in New Brunswick, the output was entirely from the Ontario oil fields.

The above statistics of production are based on the claims made for the bounty paid by the Dominion government, which was first provided for in 1904 by an Act passed by the Dominion Government authorizing the payment of a bounty of 1½ cents per gallon on crude petroleum produced from wells in Canada. The bounty was continued during 1910 under the 'Petroleum Bounty Act, 1909,' which provides for the payment of bounty on crude petroleum produced from oil-shales mined in Canada, as well as on oil from wells in Canada. Payments are made on claims submitted by the producers of crude oil to the Minister of Trade and Commerce. These claims have to be substantiated as to quantity by the certificate of the receiving stations, tanking companies, refiners or other purchasers, as well as by the supervising officers of the Department of Trade and Commerce.

The bounty paid on the crude petroleum produced gives, therefore, as accurate a basis as is available for a reliable statement of the annual production.

Table 1, following, shows the production of crude oil in Canada since 1901, in barrels of 35 gallons, together with the total value and average price per barrel.

PETROLEUM.—TABLE 1.  
Annual Production of Crude Petroleum since 1901.

Year.	Barrels of 35 gallons.	Value.	Average price per barrel.
		\$	\$ cts.
1901.....	622,392	1,008,275	1 620
1902.....	530,624	951,190	1 792
1903.....	486,637	1,048,974	2 155
1904.....	503,474	935,895	1 858
1905.....	634,095	856,028	1 350
1906.....	569,753	761,760	1 337
1907.....	788,872	1,057,088	1 340
1908.....	527,987	747,102	1 415
1909.....	420,755	559,604	1 33
1910.....	315,895	388,550	1 23
1911.....	291,092	357,073	1 225



The figures for the years 1905 to 1911 are deduced from the bounty paid by the federal government, whereas the production for the years 1901 to 1904, is based on direct returns received from refineries and producers. Further details of these figures are given below in tabular form:—

**Production of Crude Oil, 1901 to 1904, based on Direct Returns.**

Crude oil.	1901.	1902.	1903.	1904.
	Bls.	Bls.	Bls.	Bls.
Received at refineries.....	508,677	443,333	410,280	455,074
Direct sales for industrial purposes.....	113,715	87,291	76,357	48,400
Total sales of crude oil.....	622,392	530,624	486,637	503,474
Total sales in gallons.....	21,783,720	18,571,840	17,032,295	17,621,590

**Production of Petroleum estimated on the basis of the bounty of 1½ cents per gallon, paid by the Dominion Government, 1905 to 1911.**

Year.	Bounty paid.	Production of crude oil represented.	
	\$	In gallons.	In barrels.
1905.....	332,900	22,193,336	634,095
1906.....	299,120	19,941,357	569,753
1907.....	414,158	27,610,526	788,872
1908.....	277,193	18,479,547	527,987
1909.....	220,897	14,726,433	420,755
1910.....	165,845	11,056,337	315,895
1911.....	291,092	10,188,219	291,092

For the years previous to 1901, the production of crude oil was deduced from government inspection returns by assuming a ratio of crude to refined. The statistics of production, on this basis, for the years 1881 to 1900, are given in Table 2.

## PETROLEUM.—TABLE 2.

Canadian Oils and Naphtha inspected, and corresponding quantities of  
Crude Oil.

Calendar Year.	Refined oils inspected.	Crude equivalent calculated.	Ratio of crude to refined.	Equivalent in barrels of 35 gallons.	Average price per barrel of crude.	Value of crude oil.
	Gals.	Gals.			\$ cts.	\$
1881.....	6,457,270	12,914,540	100:50	368,987	.....	.....
1882.....	6,135,782	13,635,071	100:45	389,573	.....	.....
1883.....	7,447,648	16,550,328	100:45	472,866	.....	.....
1884.....	7,993,995	19,984,987	100:40	571,000	.....	.....
1885.....	8,225,882	20,564,705	100:40	587,563	.....	.....
1886.....	7,768,006	20,442,121	100:38	584,061	0 90	525,655
1887.....	9,492,588	24,980,494	100:38	713,728	0 78	556,708
1888.....	9,246,176	24,332,042	100:38	695,203	1 02 <sup>3</sup> / <sub>4</sub>	713,695
1889.....	9,472,476	24,664,144	100:38	704,690	0 92 <sup>3</sup> / <sub>4</sub>	653,600
1890.....	10,174,894	26,776,037	100:38	795,030	1 18	902,734
1891.....	10,065,463	26,435,430	100:38	755,298	1 33 <sup>3</sup> / <sub>4</sub>	1,010,211
1892.....	10,370,707	27,291,334	100:38	779,753	1 26 <sup>1</sup> / <sub>4</sub>	984,438
1893.....	10,618,804	27,944,221	100:38	798,406	1 09 <sup>1</sup> / <sub>4</sub>	874,255
1894.....	11,027,082	29,018,637	100:38	829,104	1 00 <sup>3</sup> / <sub>4</sub>	835,322
1895.....	10,674,232	25,414,838	100:42	726,138	1 49 <sup>3</sup> / <sub>4</sub>	1,086,738
1896.....	10,684,284	25,438,771	100:42	726,822	1 59	1,155,647
1897.....	10,434,878	24,844,995	100:42	709,857	1 42 <sup>1</sup> / <sub>2</sub>	1,011,546
1898.....	11,148,348	26,543,685	100:42	758,391	1 40	1,061,747
1899.....	11,927,981	28,399,955	100:42	808,570	1 48 <sup>3</sup> / <sub>4</sub>	1,202,020
1900.....	13,428,422	24,867,449	100:54	710,498	1 62	1,151,007

The production in Ontario has been obtained altogether from pools situated on the southwestern peninsula of the Province.

An estimate of the production of the various Ontario oil fields during the past five years has been kindly furnished by the Imperial Oil Company, and is shown in the next table.

The falling off in production during the past four years, it will be observed, has been common to all the important fields, although the decrease in Tilbury and Raleigh has perhaps been most pronounced.

The figures do not agree in totals with the statistics of production published in previous tables, but they will probably serve to show the relative importance of the several fields.

## Production of Ontario Oil Fields, 1908, 1909, 1910, and 1911.

District.	1908.	1909.	1910.	1911.
	Bls.	Bls.	Bls.	Bls.
Dutton.....	12,268	10,052	7,860	3,598
Leamington (Staples, Comber, and Blytheswood).....	18,117	9,367	248	
Bothwell.....	39,820	38,707	36,615	35,094
Richardson (Chatham) including Blakely.....	2,882	2,923	1,698	1,776
Thamesville.....	853	710	141	
Moore township.....	25,667	18,033	14,614	
Oil Springs.....	61,252	60,868	55,508	56,248
East Tilbury and Raleigh (including Pardo Siding and Sandison).....	170,589	115,862	60,416	49,027
Romney*.....	11,165	1,082	1,070*	12,602
Petrolia (including all districts not enumerated).....	171,019	156,581	129,372	126,089
	513,632	414,185	307,533	284,434

\* Denotes production from Onondaga in 1910 and 1911.

Another statement of production by districts is furnished by Mr. W. J. Harvey, the supervisor of petroleum bounties, as follows, the classification being somewhat different from that shown above, but the total agreeing more closely with that given in Table 1.

Field.	1907.	1908.	1909.	1910.	1911.
	Bls.	Bls.	Bls.	Bls.	Bls.
Lambton.....	304,212	265,368	243,123	205,456	184,450
Tilbury and Romney.....	411,588	201,286	124,003	63,058	48,707
Bothwell.....	42,727	39,228	38,092	36,998	35,244
Leamington.....	6,135	9,334	5,929	141	
Dutton.....	14,977	13,743	9,513	7,752	6,732
Thamesville.....	237				
Comber.....					
Onondaga (Brant Co.).....				1,005	13,501
Total.....	779,876	528,959	420,660	314,410	288,634

The oil refineries of Canada, of which there are four, viz.: the Imperial Oil Company, works at Sarnia, head office, Buffalo; the Canadian Oil Company, works at Petrolia, head office, Toronto; the British American Oil Company, works and head office at Toronto; and the Empire Refining Company, Ltd., works at Wallaceburg, use considerable quantities of imported crude oils. There is also a rapidly increasing use of imported crude fuel oils on the Pacific coast. The imports of crude oil in 1911 were 71,637,533 gallons, valued at \$2,187,952, as against 53,603,778 gallons, valued at \$1,639,320, in 1910, and 35,884,103 gallons, valued at \$1,186,400, in 1909.

All refined illuminating oils, and naphtha manufactured and shipped from Canadian refineries, are inspected by the Inland Revenue Department. The total quantities of these oils inspected during the fiscal year ending March 31, 1912, were 26,463,664.05 gallons, as compared with 27,535,283.86 gallons inspected during the previous fiscal year.

There are three inspection districts, known respectively as the London, Toronto, and Windsor districts, the first mentioned covering the refinery plants at Sarnia and Petrolia, the second the Toronto refinery, and the third the Wallaceburg refinery.

The following tables showing the quantities of refined illuminating oils and naphtha inspection in the several districts are quoted from the annual report of the Department of Inland Revenue.

### Inspection of Petroleum.

RETURN of Inspected Petroleum and Naphtha shipped from Refineries, during the fiscal Year ending March 31, 1912.

Divisions.	Petroleum.	Naphtha.	Total.
	Gals.	Gals.	Gals.
London, Ont. ....	19,913,249·47	4,340,258·61	24,253,508·08
Toronto, Ont. ....	851,220·56	1,183,049·61	2,034,270·17
Windsor, Ont. ....	121,602·40	54,283·40	175,885·80
	20,886,072·43	5,577,591·62	26,463,664·05

COMPARATIVE Statement of Inspected Petroleum and Naphtha Shipped from Refineries, during the Fiscal Years ending March 31, 1910, 1911, and 1912.

—	Petroleum.	Naphtha.	Total.
1910.			
Ontario .....	19,100,424·16	4 113,149·46	23,213,573·62
1911.			
Ontario .....	21,017,628·45	6,517,655·41	27,535,283·86
1912.			
Ontario .....	20,886,072·43	5,577,591·62	26,463,664·05

The exports of oil from Canada are comparatively small, the available statistics being shown in Table 3. During 1911 the exports as published by the Customs Department included refined oils, 489 gallons, valued at \$73, and naphtha and gasoline, 23,959 gallons, valued at \$4,427, or a total of 24,448 gallons, valued at \$4,500. There was also an export of 745,318 gallons, valued at \$85,634, of "other oils N.E.S." which probably include products of petroleum.

PETROLEUM.—TABLE 3.

## Exports of Crude and Refined Petroleum, 1881-1911.

Calendar Year.	CRUDE OIL.		REFINED OIL.		TOTAL.	
	Gals.	Value.	Gals.	Value.	Gals.	Value.
		\$		\$		\$
1881					501	99
1882					1,119	286
1883					13,283	710
1884					1,093,090	30,168
1885					337,967	10,562
1886					241,716	9,855
1887					473,559	13,831
1888					196,602	74,542
1889					235,855	10,777
1890					420,492	18,154
1891	446,770	18,471	585	104	447,355	18,575
1892	310,387	12,945	1,146	100	311,533	12,045
1893	107,719	3,696	2,196	394	109,915	4,090
1894	53,985	2,773	5,297	513	59,282	3,286
1895	22,831	1,044	10,237	2,023	33,068	3,067
1896	601	101	7,489	999	8,090	1,100
1897			342	49	342	49
1898	96	4	12,735	3,001	12,831	3,005
1899			8,559	859	3,425	859
1900	40	2	8,559	394	8,559	2,396
1901	14,168	691	375	66	14,543	757
1902	400	40	626	146	1,026	186
1903	350	15	1,013	190	1,363	205
1904	4,207	213	2,126	470	6,333	683
1905	35	2	7,228	2,078	7,263	2,080
1906	900	141	8,938	1,401	9,838	1,542
1907	1,125	102	3,132	575	4,257	677
1908			296	71	296	71
1909			7,768	934	7,768	934
1910			2,818	462	2,818	462
1911*			24,448	4,500	24,448	4,500

\*Includes naphtha and gasoline.

The imports of petroleum and petroleum products into Canada have been rapidly increasing while the domestic production has been decreasing. The imports during the calendar year 1911 totalled 116,892,689 gallons of petroleum oil crude and refined, valued at \$6,009,730, in addition to 1,959,787 pounds of wax and wax candles, valued at \$106,424. The oil imports included: crude oil, 71,653,251 gallons, valued at \$2,188,870; refined and illuminating oils, 13,690,962 gallons, valued at \$722,403; gasoline, 23,338,773 gallons, valued at \$1,976,032; lubricating oils, 5,308,917 gallons, valued at \$806,452, and other petroleum products, 2,900,786 gallons, valued at \$315,973.

The total imports in 1910 were 84,629,334 gallons of petroleum oil crude and refined, valued at \$4,826,763, and 1,362,235 pounds of wax and candles, valued at \$80,106.

Details of the imports of oils during 1910 and 1911 are shown in Table 4.

There was an increase in the imports of crude oils of 18,049,198 gallons, or 33½ per cent. An increase in the imports of refined illuminating oils of 6,034,235 gallons, or 78.8 per cent. An increase in the imports of lubricating oils of 1,227,660 gallons, or 30 per cent, and an increase in the imports of gasoline 6,659,082 gallons or 33 per cent.



## PETROLEUM.—TABLE 4.

Imports of Petroleum and Products thereof, during the Calendar years 1910 and 1911.

Products.	1910.		1911.	
	Gals.	Value.	Gals.	Value.
		\$		\$
(a) Petroleum crude, fuel and gas oils (0.8235 specific gravity or heavier).....	53,603,778	1,639,320	71,637,533	2,187,952
(b) Crude petroleum, gas oils (other than benzine naphtha and gasoline).....	275	38	15,718	918
(c) Coal and kerosene, distilled, purified, or refined.....	7,639,070	494,723	13,527,816	658,035
(d) Illuminating oils composed wholly or in part of the products of petroleum, coal, shale, or lignite, costing more than 30 cents per gallon.....	17,657	7,641	163,146	64,368
(e) Lubricating oils composed wholly or in part of petroleum, costing less than 25 cents per gallon.....	3,272,101	450,884	4,326,871	523,558
(f) Products of petroleum, N.O.P.....	2,607,606	273,364	2,900,786	315,973
(g) Lubricating oils, N.O.P.....	809,156	267,497	982,046	282,894
(h) Gasoline.....	16,679,691	1,693,296	23,338,773	1,976,032
Total.....	84,623,334	4,826,763	116,892,689	6,009,730

(a) Free. (b) Duty 1½c. per gal. (c), (e), and (f) Duty 2½c. per gal. (d) 20 per cent.  
(g) Duty 20 per cent (h) Free.

The total annual imports of petroleum oils and products, excluding the imports of paraffin wax and candles, are shown in Table 5. The imports of paraffin wax are shown in Table 7, and of wax candles in Table 8, while the total imports of crude and manufactured oils, other than illuminating, are shown in Table 6.

## PETROLEUM.—TABLE 5.

Imports of Petroleum and Products thereof, years 1880-1911.

Fiscal Year.	Gals.	Value.	Fiscal Year.	Gals.	Value.
		\$			\$
1880.....	687,641	131,359	1896.....	8,065,891	735,913
1881.....	1,437,475	262,168	1897.....	8 415,302	697,169
1882.....	3,007,702	398,031	1898.....	9,074,311	724,519
1883.....	3,086,316	358,546	1899.....	10,394,208	763,303
1884.....	3,160,282	380,082	1900.....	9,633,647	864,833
1885.....	3,767,441	415,195	1901.....	11,082,822	982,640
1886.....	3,819,146	421,836	1902.....	13,220,005	1,107,207
1887.....	4,290,003	467,003	1903.....	18,799,312	1,643,371
1888.....	4,523,056	408,025	1904.....	24,521,115	2,152,623
1889.....	4,650,274	484,462	1905.....	35,296,332	2,151,514
1890.....	5,075,650	515,852	1906.....	32,624,410	1,908,177
1891.....	5,071,386	498,330	1907 (9 mos.).....	23,645,861	1,480,261
1892.....	5,649,145	475,732	1908.....	40,213,542	2,577,059
1893.....	6,002,141	446,389	1909.....	51,700,476	3,219,243
1894.....	6,597,108	439,988	1910.....	60,017,066	3,442,604
1895.....	7,577,674	525,372	1911.....	87,245,133	4,901,608

## PETROLEUM.—TABLE 6.

## Imports of Crude and Manufactured Oils, other than Illuminating, 1881-1911.

Fiscal Year.	Gals.	Fiscal Year.	Gals.
1881.....	960,691	1897.....	802,286
1882.....	1,656,290	1898.....	1,047,026
1883.....	1,895,488	1899.....	1,017,278
1884.....	2,017,707	1900.....	1,406,700
1885.....	2,489,326	1901.....	1,838,966
1886.....	2,491,530	1902.....	2,296,353
1887.....	2,624,399	1903.....	4,316,010
1888.....	2,701,714	1904.....	7,141,109
1889.....	2,882,462	1905.....	25,002,047
1890.....	3,054,908	1906.....	23,365,674
1891.....	3,049,384	1907 (9 mos.).....	16,761,713
1892.....	3,047,199	1908.....	33,915,853
1893.....	1,481,749	1909.....	41,085,997
1894.....	1,860,829	1910.....	51,354,396
1895.....	1,106,993	1911.....	77,966,543
1896.....	1,079,965		

## PETROLEUM.—TABLE 7.

## Imports of Paraffin Wax, 1883-1911.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1883.....	43,716	5,166	1898.....	103,570	5,987
1884.....	39,010	6,079	1899.....	92,242	4,025
1885.....	59,967	8,123	1900.....	47,400	3,529
1886.....	62,035	7,953	1901.....	118,848	9,639
1887.....	61,132	6,796	1902.....	225,885	12,750
1888.....	53,862	4,930	1903.....	592,642	28,674
1889.....	63,229	5,250	1904.....	418,967	18,440
1890.....	239,229	15,844	1905.....	81,992	7,795
1891.....	753,854	50,275	1906.....	112,612	9,721
1892.....	733,873	48,776	1907 (9 mos.).....	55,021	5,922
1893.....	452,916	38,935	1908.....	62,308	8,041
1894.....	208,099	15,704	1909.....	129,631	12,795
1895.....	163,817	11,579	1910.....	429,801	27,296
1896.....	150,287	10,042	1911.....	1,856,049	81,189
1897.....	138,703	7,945			

## PETROLEUM.—TABLE 8.

## Imports of Paraffin Wax Candles, 1880-1911.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	10,445	2,269	1896.....	25,787	4,072
1881.....	7,494	1,683	1897.....	25,114	2,929
1882.....	5,818	1,428	1898.....	60,802	4,427
1883.....	7,149	1,734	1899.....	62,331	5,856
1884.....	8,755	2,229	1900.....	27,663	3,671
1885.....	9,247	2,449	1901.....	44,562	3,588
1886.....	12,242	2,587	1902.....	51,120	5,752
1887.....	21,364	3,611	1903.....	83,377	9,025
1888.....	22,054	2,829	1904.....	83,471	9,078
1889.....	8,038	1,337	1905.....	137,353	15,293
1890.....	7,233	1,186	1906.....	148,808	15,804
1891.....	10,598	2,116	1907 (9 mos.).....	38,960	5,088
1892.....	9,259	1,952	1908.....	156,934	20,035
1893.....	8,351	1,735	1909.....	110,848	14,806
1894.....	10,818	1,685	1910.....	164,822	20,842
1895.....	19,448	2,541	1911.....	181,541	22,426

Regulations have been adopted by the Dominion Government for the disposal of petroleum and natural gas rights, and of tar sands, which are outlined as follows:—

**Petroleum Regulations.**

‘Regulations for the disposal of petroleum and natural gas rights, the property of the Crown, in Manitoba, Saskatchewan, Alberta, and Northwest Territories, the Yukon Territory, and within the tract containing three and one-half ( $3\frac{1}{2}$ ) million acres of land acquired by the Dominion government from the Province of British Columbia, and referred to in sub-section (b) of section 3 of the Dominion Lands Act, approved by Order in Council, dated the 11th day of March, 1910.’

These regulations provide for the leasing of petroleum and gas rights under an area of not more than 1,920 acres to one applicant for a period of twenty-one years, subject to a rental of twenty-five (25) cents an acre for the first year, and fifty (50) cents an acre for each subsequent year.

The lessee is required to have upon the lands leased, within one year of the date of the lease, such machinery as the minister may consider necessary for the carrying on of prospecting operations, and is required to begin boring operations within 15 months of the date of the lease, which shall be continued with reasonable diligence, with a view to the discovery of oil or natural gas.

**Tar Sand Regulations.**

Regulations for the disposal of the tar sands, the property of the Crown in that portion of the Province of Alberta lying north of township 80 and between the 4th and 5th initial meridians, were approved by Order in Council, dated 14th day of February, 1910.

These provide for the leasing of an area not exceeding 1,920 acres to one applicant for a period of twenty-one years, subject to an annual rental of fifty (50) cents per acre.

After the lease has been in existence one year, the lessee may, on one year's notice, be required to begin active operations, and may be required to excavate and produce ready for shipment or treatment, a quantity not exceeding ten tons per annum, for each acre leased. Copies of the full text of the regulations may be obtained from the Department of the Interior.

## PHOSPHATE.

The production of phosphate or apatite in Canada during the past fifteen years, which has averaged only about 1,000 tons per annum, has been obtained almost altogether as a by-product in connexion with the mining of mica. The shipments during 1911 were reported as 621 tons, valued at \$5,206 at the mines, an average of \$8.38 per ton. These shipments were made from properties situated in the townships of Templeton, Wakefield, Derry, and Portland East, county of Ottawa, Quebec, and North Burgess township, county of Lanark, Ontario, and were used at Buckingham, Quebec, in the manufacture of ferro-phosphorus, phosphorus, and of fertilizers.

For a number of years previous to 1892, there was a considerable production of apatite from the district north of Buckingham, the annual output varying from 20,000 tons to 30,000 tons. The introduction of the cheaply mined phosphates of the southern states, however, resulted in the collapse of the Canadian industry, though it was claimed at the time of closing down that there was no diminution in the available supply of mineral.

Statistics of production and exports are shown in Tables 1 and 2, following:—

PHOSPHATE.—TABLE 1.  
Annual Production.

Calendar Year.	Tons.	Value.	Average value per ton.	Calendar Year.	Tons.	Value.	Average value per ton.
		\$	\$ cts.			\$	\$ cts.
1886 . . . . .	20,495	304,338	14 85	1899 . . . . .	3,000	18,000	6 00
1887 . . . . .	23,690	319,815	13 50	1900 . . . . .	1,415	7,105	5 02
1888 . . . . .	22,485	242,285	10 77	1901 . . . . .	1,033	6,280	6 07
1889 . . . . .	30,988	316,662	10 21	1902 . . . . .	856	4,953	5 79
1890 . . . . .	31,753	361,045	11 37	1903 . . . . .	1,329	8,214	6 18
1891 . . . . .	23,588	241,603	10 24	1904 . . . . .	817	4,590	5 62
1892 . . . . .	11,932	157,424	13 20	1905 . . . . .	1,300	8,425	6 48
1893 . . . . .	8,198	70,942	8 65	1906 . . . . .	850	6,375	7 50
1894 . . . . .	6,861	41,166	6 00	1907 . . . . .	824	6,018	7 30
1895 . . . . .	1,822	9,565	5 25	1908 . . . . .	1,596	14,794	9 26
1896 . . . . .	570	3,420	6 00	1909 . . . . .	998	8,054	8 07
1897 . . . . .	908	3,984	4 39	1910 . . . . .	1,478	12,578	8 51
1898 . . . . .	733	3,665	5 00	1911 . . . . .	621	5,206	8 38



## PHOSPHATE.—TABLE 2.

## Exports.

Calendar Year.	ONTARIO.		QUEBEC.		TOTAL.	
	Tons.	*Value.	Tons.	*Value.	Tons.	*Value.
		\$		\$		\$
1878	824	12,278	9,919	195,831	10,743	208,109
1879	1,842	20,565	6,604	101,470	8,446	122,035
1880	1,387	14,422	11,673	175,664	13,060	190,086
1881	2,471	36,117	9,497	182,339	11,968	218,456
1882	568	6,338	16,585	302,019	17,153	308,357
1883	50	500	19,666	427,168	19,716	427,668
1884	763	8,890	20,946	415,350	21,709	424,240
1885	434	5,962	28,535	490,331	28,969	496,293
1886	644	5,816	19,796	337,191	20,460	343,007
1887	705	8,277	22,447	424,940	23,152	433,217
1888	2,643	30,247	16,133	268,362	18,776	298,609
1889	3,547	38,833	26,440	355,935	29,987	394,768
1890	1,866	21,329	26,591	478,040	28,457	499,369
1891	1,551	16,646	15,720	368,015	17,271	384,661
1892	1,501	12,544	9,981	141,221	11,482	153,765
1893	1,990	11,550	5,748	56,402	7,738	67,952
1894	1,980	10,560	3,470	29,610	5,450	40,170
1895			250	2,500	250	2,500
1896	1	5	299	2,990	300	2,995
1897	70	450	165	400	235	850
1898	21	240	702	8,000	723	8,240
1899	215	1,850	93	1,725	308	3,575
1900					Nil	Nil
1901					6	120
1902					70	1,886
1903					1	20
1904					191	5,348
1905					40	1,253
1906						
1907						
1908					1	30
1909					895	15,735
1910					0	0
1911					3	100

\* These values do not compare with those in Table 1 ; the spot value is adopted for the production, while the exports are valued upon quite a different basis.

The imports of phosphate rock (fertilizer) in 1911 were valued at \$46,217; phosphorus, 14,818 pounds, valued at \$4,384, and manufactured fertilizers, valued at \$386,645. The imports in 1910 included phosphate rock (fertilizer), valued at \$72,950; phosphorus, 6,752 pounds, valued at \$2,065, and manufactured fertilizers, valued at \$388,467.

Phosphorus is manufactured at Buckingham by the Electric Reduction Company. The exports of phosphorus during the twelve months ending December 31, 1911, were 524,370 pounds, valued at \$76,608.

## PYRITES.

The total shipments of pyrites in 1911 were reported as 82,666 tons, valued as reported by the producers at \$365,820. The shipments include 39,122 tons of copper pyrites from Quebec mines, valued at \$247,555, and 43,544 tons of iron pyrites, valued at \$118,265, from Ontario properties. In 1910, the total shipments were 53,870 tons, being 24,242 tons of copper pyrites from Quebec, and 29,628 tons of iron pyrites from Ontario.

The total exports of pyrites from Canada in 1911 are reported by the Customs Department as 32,102 tons, valued at \$120,585, as compared with exports in 1910 of 30,434 tons, valued at \$110,071, and in 1909 of 35,798 tons, valued at \$156,644.

The imports of brimstone and crude sulphur during the calendar year 1911, were 21,831 tons, valued at \$446,491, as against 22,835 tons, valued at \$474,619, in 1910.

No record is available of the quantity of sulphuric acid manufactured in Canadian acid plants, but the quantity of sulphuric acid imported during the calendar year 1911, according to customs returns, was 1,031,803 pounds, valued at \$9,281, as compared with 2,474,802 pounds, valued at \$21,702, in 1910.

Statistics of production and exports of pyrites, of imports of brimstone and crude sulphur and of imports of sulphuric acid, are shown in the following tables:—

**PYRITES.—TABLE 1.**  
**Annual Production.**

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886. ....	42,906	193,077	1899. ....	27,687	110,748
1887. ....	38,043	171,194	1900. ....	40,031	155,164
1888. ....	63,479	285,656	1901. ....	35,261	130,544
1889. ....	72,225	307,292	1902. ....	35,616	138,939
1890. ....	49,227	123,067	1903. ....	33,982	127,713
1891. ....	67,731	203,193	1904. ....	37,180	134,033
1892. ....	59,770	179,310	1905. ....	33,339	125,486
1893. ....	58,542	175,626	1906. ....	42,743	169,990
1894. ....	40,527	121,581	1907. ....	46,243	212,491
1895. ....	34,198	102,594	1908. ....	47,336	224,824
1896. ....	33,715	101,155	1909. ....	64,644	222,812
1897. ....	38,910	116,730	1910. ....	53,870	187,064
1898. ....	32,218	128,872	1911. ....	82,666	365,820

## PYRITES.—TABLE 2.

## Imports:—Brimstone\* and Crude Sulphur.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
		\$			\$
1880.....	1,775,489	27,401	1896.....	6,934,190	63,973
1881.....	2,118,720	36,956	1897.....	8,672,751	87,719
1882.....	2,375,821	40,329	1898.....	38,026,798	373,786
1883.....	2,336,085	36,737	1899.....	24,517,026	265,799
1884.....	2,195,735	37,463	1900.....	21,128,656	215,433
1885.....	2,248,986	35,043	1901.....	23,856,651	270,608
1886.....	2,922,043	43,651	1902.....	24,640,735	325,307
1887.....	3,103,644	38,750	1903.....	24,412,737	259,123
1888.....	2,048,812	25,318	1904.....	19,364,730	204,663
1889.....	2,427,510	34,006	1905.....	23,435,140	242,251
1890.....	4,440,799	44,276	1906.....	43,047,672	436,156
1891.....	3,601,748	46,351	1907 (9 mos.).....	25,854,615	277,439
1892.....	4,769,759	67,095	1908.....	51,806,739	517,249
1893.....	6,381,203	77,216	1909.....	44,049,172	426,569
1894.....	5,845,463	61,558	1910.....	42,943,340	430,632
1895.....	4,900,225	56,965	1911.....	50,562,547	524,473

\*Brimstone, crude or in roll or flour, or sulphur in roll or flour.

## PYRITES.—TABLE 3.

## Exports of Pyrites.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1894.....	8,532	33,205	1903.....	21,067	59,604
1895.....	7,705	38,298	1904.....	18,279	49,911
1896.....	15,002	33,837	1905.....	19,755	55,767
1897.....	15,096	30,812	1906.....	26,050	65,349
1898.....	9,804	26,387	1907.....	25,056	80,139
1899.....	15,599	34,084	1908.....	17,283	96,600
1900.....	17,620	41,182	1909.....	35,798	156,644
1901.....	24,971	57,263	1910.....	30,434	110,071
1902.....	18,584	50,178	1911.....	32,102	120,585

## PYRITES.—TABLE 4.

## Imports of Sulphuric Acid.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
		\$			\$
1885.....	774,764	10,791	1899.....	165,637	2,427
1886.....	507,927	7,930	1900.....	740,858	7,066
1887.....	678,603	8,468	1901.....	448,608	5,272
1888.....	2,494,648	35,415	1902.....	420,731	4,626
1889.....	181,652	2,606	1903.....	102,314	2,332
1890.....	211,871	2,927	1904.....	113,407	2,563
1891.....	177,627	2,466	1905.....	920,804	8,227
1892.....	222,628	2,837	1906.....	822,585	8,558
1893.....	172,422	2,367	1907.....	733,151	6,901
1894.....	107,520	1,648	1908.....	650,095	7,582
1895.....	174,605	2,481	1909.....	241,388	3,298
1896.....	114,137	1,430	1910.....	914,058	8,466
1897.....	977,446	8,033	1911.....	2,486,992	21,855
1898.....	665,344	5,536			

Following is a list of the firms operating pyrites mines:—

The Eustis Mining Company, Eustis, Que.

East Canada Smelting Company, Limited, Weedon, Que.

The Nichols Chemical Company of Canada, Limited, Sulphide, Ont.

The Canadian Sulphur Ore Company, Limited, Madoc, Ont.

The Northern Pyrites Company, Dinorwic, Ont.

Lake Superior Power Company, Sault Ste. Marie, Ont.

## SALT.

The production of salt in Canada is obtained from the salt fields in south-western Ontario, although there was at one time a very small production in New Brunswick and Manitoba.

The total sales of salt in 1911 were 91,582 tons, valued at \$443,004 exclusive of packages, as compared with sales of 84,092 tons, valued at \$409,624, in 1910, showing a slight increase in production, in 1911.

The average number of men employed during the year was reported as 225, and the amount paid in wages \$123,040. The value of the packages used during the year was \$198,789, and stock of salt in manufacturers' hands at the close of the year was reported as 1,422 tons.

Detailed statistics of the production during the past six years, showing the total sales of salt, the value of the sales exclusive of packages, the values of the packages used, stock in manufacturers' hands at the end of each year, number of men employed and wages paid, are given in Table 1, while the total annual productions since 1886 are given in Table 2.

**SALT.—TABLE 1.**  
**Detailed Statistics of Production, 1906-1911.**

		1906.	1907.	1908.	1909.	1910.	1911.
Sales of salt . . . . .	Tons	76,762	72,697	79,975	84,037	84,092	91,582
Value of salt (exclusive of packages) . . . . .	\$	329,130	342,315	378,798	415,219	409,624	443,004
Value of packages . . . . .	\$	147,705	149,823	168,019	175,612	173,446	198,789
Stock in manufacturers' hands at end of year . . . . .	Tons	6,365	3,923	5,631	2,671	2,474	1,422
Men employed . . . . .	No.	210	215	207	185	208	225
Wages paid . . . . .	\$	92,000	95,667	95,575	96,116	112,909	123,040

**SALT.—TABLE 2.**  
**Annual Production, 1886-1911.**

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886. . . . .	62,359	227,195	1899. . . . .	59,339	254,390
1887. . . . .	60,173	166,394	1900. . . . .	62,055	279,458
1888. . . . .	59,070	185,460	1901. . . . .	59,428	262,328
1889. . . . .	32,832	129,547	1902. . . . .	64,456	292,581
1890. . . . .	43,754	198,857	1903. . . . .	62,452	297,517
1891. . . . .	45,021	161,179	1904. . . . .	69,477	321,778
1892. . . . .	45,486	162,041	1905. . . . .	67,340	320,858
1893. . . . .	62,324	195,926	1906. . . . .	76,720	329,130
1894. . . . .	57,199	170,687	1907. . . . .	72,697	342,315
1895. . . . .	52,376	160,455	1908. . . . .	79,975	378,798
1896. . . . .	43,960	169,693	1909. . . . .	84,037	415,219
1897. . . . .	51,348	225,730	1910. . . . .	84,092	409,624
1898. . . . .	57,142	248,639	1911. . . . .	91,582	443,004



As will be seen by the above table, the salt industry is slowly but steadily developing; the figures of production for 1911 being the highest yet recorded.

The salt fields of western Ontario are very extensive. The salt beds form part of the Onondaga formation, of Silurian age, and the saliferous horizons underlie a territory extending from Kincardine to Lake Erie, bordering Lake Huron and the Detroit river. This basin measures an extreme length of 150 miles, with a maximum width of 40 miles at the centre and tapering towards the ends. This would cover an area of 2,500 square miles. An idea of the immense deposits of salt contained in this area may be gathered from the fact that a bore-hole sunk at Goderich, in Huron county, to a depth of 1,517 feet, went through six beds of salt, ranging in thickness from 6 feet to 35 feet, whereas, at Windsor, in a well 1,672 feet deep, four beds were traversed, one of which is said to measure 250 feet in thickness.

So far the salt industry of western Ontario is confined to the production of salt for the trade, but the Canadian Salt Company at their Sandwich branch, in 1911 installed a plant for the manufacture of caustic soda and bleaching powder and commenced operations during the last week of the year. The imports of some of the soda products during the calendar years 1910 and 1911 are shown in the accompanying table.

	1910.		1911.	
	Lbs. imported.	Value.	Lbs. imported.	Value.
		\$		\$
Soda, ash, or barilla .....	35,596,006	306,167	44,682,937	375,132
Soda bichromate.....	878,777	32,842	327,307	19,193
Caustic soda in packages, 25 lbs. or more.....	13,848,170	260,938	13,708,922	253,612
Sal soda.....	9,715,272	72,845	10,202,422	64,107
Sulphate of soda.....	17,728,543	95,054	13,782,241	88,761
		767,846		800,805

As at present carried on in western Ontario, the salt industry consists essentially in the production of table, dairy, and coarse salt, and a small quantity of land salt. These are manufactured by forcing water down bore-holes sunk to the rock salt bed, through a casing inside of which is a pipe of smaller diameter. A powerful pump forces water down the outer tube, this dissolves the salt, eventually forming large cavities at the bottom of the well, which offer a great surface of salt to the action of the water.

The water forced downwards is charged to saturation in the salt cavity, and, as the rock is not fissured or porous, this brine is forced upwards through the inner tube. After a process of purification and settling, this brine is evaporated either in vacuum pans or in large open air vats, and after passing through mechanical dryers or over drying floors, the salt is ready for the market.

The following are analyses of brines obtained from wells in these salt fields. The figures are for 1,000 parts by weight:—

Analyses of Brines.<sup>1</sup>

	Sodium chloride.	Calcium chloride.	Magne- sium chloride.	Sulphate of lime.	Specific gravity.	Degrees of salometer.
Goderich, sample taken August 19, 1866.....	259·000	0·432	0·254	1·882	1·205	100
Goderich, same well as above. November 5, 1868.....	236·410	0·190	0·410	4·858	1·187	92
Clinton well.....	204·070	0·470	0·184	5·583	1·157	80
Kincardine.....	241·350	0·840	0·230	3·264	1·191	94

<sup>1</sup> Analyses by Dr. T. Sterry Hunt, laboratory, Geological Survey of Canada.

## EXPORTS AND IMPORTS.

Comparatively small quantities only of salt are now exported from Canada, the exports in 1911 being 454,600 pounds, valued at \$5,055.

The imports of salt on the other hand are quite considerable. For the calendar year 1911, the imports of salt, subject to duty, included salt in bulk, dutiable at 5 cents per 100 pounds, 16,818 tons, valued at \$53,162, and salt in bags, barrels or other packages, dutiable at 7½ cents per 100 pounds, 6,358 tons, valued at \$56,631. Salt imported from the United Kingdom or any British possession, or imported for the use of the sea or gulf fisheries, duty free, was imported to the extent of 101,174 tons, valued at \$326,325, giving total imports of 124,350 tons, valued at \$436,118.

Tables 3, 4, and 5, following, give the statistics of exports and imports of salt, since 1880.

SALT.—TABLE 3.

## Exports.

Calendar Year.	Bushels.	Value.	Calendar Year.	Bushels.	Value.
		\$			\$
1880.....	467,641	46,211	1897.....	5,383	1,193
1881.....	343,208	44,627	1898.....	5,202	1,252
1882.....	181,758	18,350	1899.....	11,205	2,773
1883.....	199,733	19,492	1900.....	37,653	8,997
1884.....	167,029	15,291	1901.....	39,224	6,510
1885.....	246,794	18,756	1902.....	9,331	3,798
1886.....	224,943	16,886		Lbs.	
1887.....	154,045	11,526	1903.....	1,915,648	5,927
1888.....	15,251	3,987	1904.....	1,006,036	4,186
1889.....	8,557	2,390	1905.....	1,447,728	6,112
1890.....	6,605	1,166	1906.....	618,707	3,437
1891.....	5,290	1,277	1907.....	2,222,542	7,709
1892.....	2,000	504	1908.....	529,229	3,840
1893.....	4,940	1,267	1909.....	276,765	2,488
1894.....	4,639	1,120	1910.....	275,200	2,618
1895.....	4,865	959	1911.....	454,600	5,055
1896.....	3,842	899			

SALT.—TABLE 4.

## Imports:—Salt Paying Duty.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
		\$			\$
1880.....	726,640	3,916	1896.....	7,665,257	24,550
1881.....	2,588,465	6,355	1897.....	11,911,766	33,470
1882.....	3,679,415	12,318	1898.....	11,068,785	32,792
1883.....	12,136,968	36,223	1899.....	11,781,453	32,839
1884.....	12,770,950	38,949	1900.....	11,028,337	30,180
1885.....	10,397,761	31,726	1901.....	11,625,688	34,087
1886.....	12,266,021	39,181	1902.....	13,892,849	39,605
1887.....	10,413,258	35,670	1903.....	14,554,693	41,785
1888.....	10,509,799	32,136	1904.....	29,779,183	73,826
1889.....	11,190,088	38,968	1905.....	18,473,868	58,056
1890.....	15,135,109	57,549	1906.....	21,366,064	59,805
1891.....	15,140,227	59,311	1907 (9 mos.).....	21,834,435	58,553
1892.....	18,648,191	65,963	1908.....	31,019,400	79,341
1893.....	21,377,339	79,838	1909.....	31,653,900	83,660
1894.....	15,867,825	53,336	1910.....	35,230,000	83,043
1895.....	8,498,404	29,881	1911.....	39,251,300	94,461

	1910.		1911.	
	Pounds.	Value.	Pounds.	Value.
		\$		\$
Salt, fine, in bulk, N.E.S. (a).....	24,275,700	41,703	27,970,500	45,178
Salt, N.E.S., in bags, barrels or other packages (b)	10,954,300	41,340	11,280,800	49,233
Total.....	35,230,000	83,043	39,251,300	94,461

(a) Duty 5c per 100 lbs. (b) Duty 7½c per 100 lbs.

SALT.—TABLE 5.

## Imports:—Salt not Paying Duty.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
		\$			\$
1880.....	212,714,747	400,167	1896.....	205,005,100	338,888
1881.....	231,640,610	488,278	1897.....	215,844,484	312,117
1882.....	166,183,962	311,489	1898.....	202,634,927	293,410
1883.....	246,747,113	386,144	1899.....	183,046,365	267,520
1884.....	225,390,121	321,243	1900.....	193,554,550	295,253
1885.....	171,571,209	255,719	1901.....	216,271,603	339,887
1886.....	180,205,949	255,359	1902.....	238,648,737	385,629
1887.....	203,042,332	285,455	1903.....	232,708,675	361,185
1888.....	184,166,986	220,975	1904.....	198,634,047	338,082
1889.....	180,847,800	253,009	1905.....	196,907,500	340,954
1890.....	158,490,075	252,291	1906.....	203,080,000	352,214
1891.....	195,491,410	321,239	1907 (9 mos.).....	139,459,900	240,841
1892.....	201,831,217	314,995	1908.....	200,944,800	350,878
1893.....	191,595,530	281,462	1909.....	232,237,700	376,961
1894.....	196,668,730	328,300	1910.....	232,559,900	382,210
1895.....	201,691,248	332,711	1911*.....	205,784,700	330,251

\* Salt imported from the United Kingdom, or any British possession, or imported for the use of the sea or gulf fisheries.

## Consumption of Salt in Canada in 1910 and 1911.

	1910.		1911.	
	Pounds.	Value.	Pounds.	Value.
		\$		\$
Canadian salt production.....	168,184,000	409,624	183,164,000	413,004
Less exports .....	275,200	2,618	454,600	5,055
	167,908,800	407,006	182,709,400	437,949
Imports of salt paying duty. ....	35,230,000	83,043	39,251,300	94,461
" " free of duty.....	232,559,900	382,210	205,784,700	330,251
	435,698,700	872,259	427,745,400	862,661

The following is a list of operators:—

Operator.	Address.
The Canadian Salt Co., Ltd.....	Windsor, Ont.
" " (Sandwich Branch).....	"
The Western Salt Co., Ltd.....	Mooretown, Ont.
Dominion Salt Co., Ltd.....	Sarnia, Ont.
The Elarton Salt Works, Co., Ltd.....	Hyde Park Corner, Ont.
Parkhill Salt Co.....	Parkhill, Ont.
Exeter Salt Works Co.....	Exeter, Ont.
Western Canada Flour Mills Co., Ltd.....	Goderich, Ont.
North American Chemical Co. (J. Ransford).....	"
Stapleton Salt Works, (Jno. Ransford).....	Clinton, Ont.
Grey, Young & Sparling Co., of Ont., Ltd.....	Wingham, Ont.
Ontario People's Salt & Soda Co., Ltd.....	Kincardine, Ont.

## MISCELLANEOUS NON-METALLICS.

### ARSENIC.

The only production of arsenic in Canada, in 1911, was that recovered by the smelters at Copper Cliff, Deloro, Thorold, and Orillia, in Ontario, from the ores of the Cobalt district treated at these plants.

The total production of arsenious oxide or white arsenic was 2,097 tons, valued at \$76,237. In 1910, the production of white arsenic was 1,502 tons, valued at \$75,328, in addition to which 547 tons of arsenical ore or concentrates, valued at \$5,716, were shipped from Goldboro, Nova Scotia, by the New England Mining Company. This arsenical concentrate was produced from the residue of the mill concentrates after the gold had been extracted by bromo-cyanide. The New England Mining Company did not operate during 1911.

The exports of white arsenic in 1911 were, according to Customs reports, 4,125,558 pounds (2,062 tons) valued at \$81,761, as compared with 4,512,673 pounds (2,256 tons) valued at \$173,932 exported in 1910.

The imports of arsenious oxide in 1911 were 7,338 pounds, valued at \$158, and of sulphide of arsenic, 330,170 pounds, valued at \$6,665. The 1910 imports were arsenious oxide 260,415 pounds, valued at \$6,891, and sulphide of arsenic, 257,451 pounds, valued at \$8,946.

Under the terms of "An Act to encourage the refining of metals in Ontario," passed in 1907, and an amendment Act passed in 1912, a bounty of one half cent per pound is offered by the Ontario government on white arsenic otherwise known as arsenious acid produced from mispickel ores and not from ores carrying smaltite or niccolite or cobaltite, the total bounty paid not to exceed \$15,000 in any one year—this bounty is available until the year 1917. The full text of the Act will be found reproduced in the chapter on cobalt.

It will be observed that under the terms of this Act, the bounty is not payable on the present production of arsenic which is entirely from the Cobalt district.

In the following tables the production of arsenical ore and white arsenic and the imports and exports of arsenic are shown.



## Annual Production of Arsenic.

Calendar Year.	ARSENICAL ORE.		WHITE ARSENIC.	
	Tons.	Value.	Tons.	Value.
1885		\$		\$
1886			440	17,600
1887			120	5,460
1888			30	1,200
1889			30	1,200
1890			Nil.	Nil.
1891			25	1,500
1892-3			20	1,000
1894			Nil.	Nil.
1895-8			7	420
1899			Nil.	Nil.
1900			57	4,872
1901			303	22,725
1902			695	41,676
1903			800	48,000
1904-5			257	15,420
1906			201	14,058
1907	656	11,094	330	36,209
1908	986	17,506	715½	41,060
1909	224	3,346	1,129	64,100
1910	547	5,716	1,502	75,328
1911			2,097	76,237

## Exports of White Arsenic.

Calendar Year.	Pounds.	Value.	Calendar Year.	Pounds.	Value.
1902	547,698	\$	1907	613,504	\$
1903	395,573	16,192	1908	1,913,732	10,850
1904	146,000	10,583	1909	3,111,249	43,493
1905	108,000	6,900	1910	4,512,673	119,673
1906	271,063	5,400	1911	4,125,558	173,932
		5,981			81,761

## Annual Imports of Arsenic, 1880-1906.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
		\$			\$			\$
1880	18,197	576	1889	69,269	2,434	1898	291,967	14,270
1881	31,417	1,070	1890	138,509	4,474	1899	582,383	24,203
1882	138,920	3,962	1891	115,248	4,027	1900	230,730	11,035
1883	51,953	1,812	1892	302,958	9,365	1901	159,263	8,361
1884	19,337	773	1893	447,079	12,907	1902	106,857	6,004
1885	49,080	1,566	1894	292,505	10,018	1903	298,375	11,824
1886	30,181	961	1895	1,115,697	31,932	1904	414,065	12,421
1887	32,436	1,116	1896	664,854	27,523	1905	268,274	7,661
1888	27,510	1,016	1897	152,275	8,378	1906 Duty free	446,975	19,169

## Imports of Arsenious Oxide and Sulphide of Arsenic.

Fiscal Year.	ARSENIUS OXIDE.*		ARSENIC, SULPHIDE OF.*		Total.
	Pounds.	Value.	Pounds.	Value.	
		\$		\$	\$
1907 (9 mos.) .....	252,473	16,011	95,843	6,116	22,127
1908 .....	378,174	26,804	125,322	7,531	34,335
1909 .....	123,612	4,064	389,815	14,575	18,639
1910 .....	27,066	1,410	301,563	11,485	12,895
1911 .....	254,347	6,605	257,996	8,093	14,698

\*Duty free.

## CHALK AND WHITING.

These materials are not produced in Canada, but statistics of their importation are given to show the market for them in Canada.

## Annual Imports of Chalk and Whiting, 1880-1911.

Fiscal Year.	CHALK (a)	WHITING (b)		Fiscal Year.	CHALK (a)	WHITING (b)	
	Value.	Cwt.	Value.		Value.	Cwt.	Value.
	\$		\$		\$		\$
1880 .....	2,117	84,115	26,092	1896 .....	6,467	113,791	27,322
1881 .....	2,768	47,480	16,637	1897 .....	7,432	102,453	22,541
1882 .....	2,882	36,270	16,318	1898 .....	9,338	166,293	25,761
1883 .....	5,067	76,012	29,334	1899 .....	10,461	134,884	34,310
1884 .....	2,589	76,268	28,230	1900 .....	12,212	127,455	34,575
1885 .....	8,003	67,441	23,492	1901 .....	11,629	209,868	60,878
1886 .....	6,583	65,124	25,533	1902 .....	11,337	153,982	42,136
1887 .....	5,635	47,246	15,191	1903 .....	16,497	139,804	39,867
1888 .....	5,865	76,619	20,508	1904 .....	19,163	186,919	42,507
1889 .....	5,336	84,658	22,735	1905 .....	20,896	198,485	51,215
1890 .....	7,221	96,243	27,471	1906 .....	23,853	160,030	44,876
1891 .....	8,193	84,679	27,504	1907 (9 mos.)...	17,446	128,018	33,453
1892 .....	9,558	102,985	26,867	1908 .....	24,122	228,699	63,499
1893 .....	9,966	88,835	25,563	1909 .....	24,066	150,484	45,314
1894 .....	11,308	103,633	26,649	1910 .....	29,566	206,641	76,404
1895 .....	7,730	102,751	25,441	1911 .....	36,776	254,839	97,338

(a) Chalk prepared. Duty 20 per cent. (b) Whiting or whitening, gilders whiting, and Paris white. Duty free.

## FLUORSPAR.

The occurrence of fluorspar has been noted on lot 1, concession IV, of Madoc township, Hastings county, Ontario, and some very fine crystals have been obtained from this deposit. In 1905, the deposit was opened by S. Wellington of Madoc, and a shipment of 12 tons made to Port Hope. In 1910, there were mined 200 tons, of which two tons, valued at \$15, and in 1911, 34 tons, valued at \$238, were shipped to the metallurgical works at Deloro, and the Canadian Steel Foundries, Ltd., at Welland.

Imports of fluorspar are not separately shown in the report of the Customs Department, but considerable quantities are used in steel furnaces, the quantity thus consumed in 1910 being reported as 7,461 tons, and in 1911, 8,067 tons.

The imports of hydro-fluor-silicic acid were:—

	Lbs.	\$
Fiscal year, 1910 . . . . .	433,680	22,622
do 1911 . . . . .	234,380	12,324
do 1912 . . . . .	167,112	9,137

## MAGNESITE.

Magnesite is found in Canada in the Eastern Townships of the Province of Quebec, in the township of Grenville, Argenteuil county, of the same Province, and also in the town of Atlin, British Columbia.

The Grenville Township deposits are the only ones being operated, the shipments in 1911 being reported as 991 tons, valued at \$5,531. The deposit is situated about 12 miles from Calumet on the Canadian Pacific railway, and has for several years been operated by the Canadian Magnesite Company of Montreal. Mining operations are being carried on on the north half of lot 18, range XI, and the north half of lot 15, range IX, township of Grenville.

The Superintendent of Mines of Quebec reports that much development work was done on the property during 1911, and it is claimed that there is now a quantity of over 100,000 tons of merchantable magnesite blocked out. A calcining kiln of a capacity of 12 to 15 tons of finished product has been installed on the property as well as a grinding plant. It is expected that shipments of calcined magnesite will begin in May, 1912.

Shipments of the crude mineral in 1910 were, 323 tons, valued at \$2,160; in 1909, 330 tons, valued at \$2,508, and in 1908, 120 tons, valued at \$840.

## QUARTZ.

Considerable quantities of quartz are used by the smelters of nickel copper ores. It is also used in the manufacture of ferro-silicon, and ground quartz is used by the manufacturers of sanitary ware and enamelled ware.

The production, in 1911, was reported as 60,526 tons, valued at \$83,865, as compared with 88,205 tons, valued at \$91,951, in 1910, and 56,924 tons, valued at \$71,285, in 1909.

The imports of silex or crystallized quartz, in 1911, were 394 tons, valued at \$7,518, and the imports of flint during the same year were 3,766 tons, valued at \$49,106.

A production of flint in Canada is reported for the first time in 1911. There is but one company operating, viz.: The Canada Pebble Company of Port Arthur, Ont., and the flint pebbles are obtained from near Jackfish, Ontario. The production is included with quartz.

Statistics of the annual production of quartz so far as these have been obtained, are shown in the next table.

### Annual Production of Quartz.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1890 .....	200	1,000	1900-1905.....		
1891-2 .....			1906.....	48,376	65,765
1893 .....	100	500	1907.....	56,585	124,148
1894-5-6.....	10	50	1908.....	44,741	52,830
1897.....			1909.....	56,924	71,285
1898.....	284	570	1910.....	88,205	91,951
1899.....	600	1,260	1911.....	60,526	83,865

### Imports of Silex:—Crystallized Quartz.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$
1880.....	5,252	2,290	1896.....	3,289	2,174
1881.....	3,251	1,659	1897.....	2,564	3,415
1882.....	3,283	1,678	1898.....	3,104	2,773
1883.....	3,543	2,058	1899.....	3,951	2,595
1884.....	3,259	1,709	1900.....	4,021	2,876
1885.....	3,527	1,443	1901.....	3,562	2,106
1886.....	2,520	1,313	1902.....	4,388	3,858
1887.....	14,533	5,073	1903.....	3,514	2,762
1888.....	4,808	2,385	1904.....	5,547	4,409
1889.....	5,130	1,211	1905.....	8,931	4,475
1890.....	1,768	2,617	1906.....	7,465	8,347
1891.....	3,674	1,929	1907 (9 mos.).....	11,964	12,969
1892.....	1,429	1,244	1908.....	24,938	19,166
1893.....	2,447	1,301	1909.....	6,206	6,909
1894.....	2,451	1,521	1910.....	11,460	9,531
1895.....	2,882	1,881	1911 Duty free.....	11,348	10,634

## TALC.

Talc is being mined in Canada in the Province of Ontario only, two mines being operated during 1911, in the county of Hastings, at Madoc, and Eldorado, respectively.

The production has increased considerably during the past two or three years, the shipments in 1911 being 7,300 tons, valued at \$22,100, as compared with 7,112 tons, valued at \$22,308, shipped in 1910, and 4,350 tons, valued at \$10,300, shipped in 1909.

Formerly the output was exported to United States points and used chiefly in the manufacture of cosmetics. Recently, however, mills have been erected at Madoc for grinding the crude talc and preparing it for the trade. Most of the finished material is now sold in Canada, a large part being used in the paper trade.

The mine operators are:—

Messrs. Cross & Wellington, Madoc, Ont.

The Canadian Talc & Silica Co., Madoc, Ont.

Messrs. Cross & Wellington have been mining talc for many years. The greater part of their product is now sold to Geo. H. Gillespie & Company, who operate a talc grinding mill in the town of Madoc. The Canadian Talc & Silica Co. began operations in 1910, and erected a grinding mill at Eldorado during the past year.

### Annual Production of Soapstone and Talc.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886 .....	50	400	1899 .....	450	1,960
1887 .....	100	800	1900 .....	1,420	6,365
1888 .....	140	280	1901 .....	259	842
1889 .....	195	1,170	1902 .....	689	1,804
1890 .....	917	1,239	1903 .....	990	2,739
1891 .....	Nil	Nil	1904 .....	840	1,875
1892 .....	1,374	6,240	1905 .....	500	1,800
1893 .....	717	1,920	1906 .....	1,234	3,030
1894 .....	916	1,640	1907 .....	1,534	4,602
1895 .....	475	2,138	1908 .....	1,616	3,048
1896 .....	410	1,230	1909 .....	4,350	10,300
1897 .....	157	350	1910 .....	7,112	22,308
1898 .....	405	1,000	1911 .....	7,300	22,100



## STRUCTURAL MATERIALS AND CLAY PRODUCTS.

The subjects included under this heading comprise, in the order treated: cement; clay products of various kinds, such as brick, sewerpipe and tile, pottery, etc.; lime; sand-lime brick; sands and gravels; slate; and stone for building and other purposes, including granite, marble, limestone, sandstone, etc. In the case of sands and gravels no complete record of production throughout Canada has been obtained, but statistics of exports are published. The statistics of stone production do not include the stone used in making cement or lime, but are as complete as possible for all other established stone quarries; nevertheless there is undoubtedly a large production of stone for foundation work, road-making, and railway construction of which no record is available.

The total value of the production of these structural products in 1911 according to the record obtained was \$22,709,611, as compared with a value of \$19,627,592 in 1910, an increase of \$3,082,019, or 15.7 per cent. The total production in 1909 was valued at \$16,533,349, as compared with which the 1910 production showed an increase of \$3,094,243, or 18.7 per cent.

The Canadian consumption of products of this class is apparently increasing at an even more rapid rate than the production. The consumption based upon the above figures of production in conjunction with the record of exports and imports was in 1911 only a little less than \$30,000,000, as against about \$25,250,000 in 1910 and \$20,350,000 in 1909, the increase in 1911 being 18 per cent and in 1910, 24 per cent.

The large increase in production and consumption of structural materials is only a natural accompaniment of the great national development taking place in Canada. The normal growth of population supplemented by the large immigration now constantly in progress has resulted in a great wave of construction in the building up of cities, the construction of railways, highways, and public works of all kinds.

The building permits issued in a number of the principal cities and towns are but one proof of this growth.

Building permits in thirty-four cities in 1911 aggregated nearly \$32,000,000 in value, as against \$29,000,000 in 1910, an increase of over 28 per cent, and the year 1910 shows a similar increase over 1909 in permits issued of nearly 46 per cent.

A summary of the production of structural materials and clay products since 1907 is shown following:—

	1907.	1908.	1909.	1910.	1911.
	\$	\$	\$	\$	\$
Cement.....	3,781,371	3,709,954	5,345,802	6,412,215	7,644,537
Clay products.....	5,772,117	4,500,702	6,450,840	7,629,956	8,359,933
Lime.....	974,595	712,947	1,132,756	1,137,079	1,517,599
Sand-lime brick.....	167,795	152,856	201,650	371,857	442,427
Sand and gravels (exports).....	119,853	161,387	256,166	407,974	408,110
Slate.....	20,056	13,496	19,000	18,492	8,248
Stone.....	2,027,262	2,088,613	3,127,135	3,650,019	4,328,757
Total.....	12,863,049	11,339,955	16,533,349	19,627,592	22,709,611

The increase in the value of cement sales in 1911 over 1910 was 19 per cent; clay products show an increased production of 9.6 per cent; stone an increase of 18.6 per cent; lime an increase of nearly 29 per cent; sand-lime brick an increase of 15.6 per cent. The production of slate is at no time large, but shows a falling off in 1911.

The export of products of this class is comparatively small, being valued at only \$484,047 in 1911, of which over 90 per cent was made up of sand and gravel. The imports, on the other hand, aggregated \$7,710,552 in value, and included Portland cement, \$834,876; clay products, \$5,156,544; lime, \$161,985; sand and gravel, \$246,613; slate, \$169,685; and stone, \$1,140,846.

## CEMENT.

The production of cement in Canada during the past few years, though all classed as Portland, has included an output of Puzzolan cement, made from blast furnace slag at Sydney, N.S., and a small production of 'natural Portland,' made at Babcock, Manitoba, 75 miles southwest of Winnipeg, on the Canadian Northern railway.

The total quantity of cement made in Canada during 1911, as per reports received from the manufacturers, was 5,677,539 barrels of 350 pounds net each (993,569 tons), as compared with 4,396,282 barrels (769,349 tons) made in 1910—an increase of 1,281,257 barrels, or over 29 per cent.

The total quantity of Canadian Portland cement sold in 1911 was 5,692,915 barrels (996,260 tons), as compared with 4,753,975 barrels (831,946 tons) in 1910—an increase of 938,940 barrels, or nearly 20 per cent.

The total consumption of Portland cement in 1911, including Canadian and imported cement, was 6,354,831 barrels of 350 pounds net (1,112,095 tons) as compared with 5,103,285 barrels (893,075 tons) in 1910—or an increase of 1,251,546 barrels, or nearly 25 per cent.

The cement industry has been rapidly growing in importance, and its output is now exceeded in value amongst non-metallic products by coal and clay products only.

An average of 3,010 men were employed in 1911, the total wages paid being reported as \$2,103,838.

The increase in annual production since 1905 has been nearly four-fold. The production per capita in 1911 was about 278 pounds, as against only 79 pounds in 1905. The approximate consumption per capita has increased during the same period from 115 pounds to 310 pounds.

A similar rapid increase in both production and consumption has taken place in the United States, where the annual production now exceeds 75,000,000 barrels.

The production per capita in the United States was in 1910 about 332 pounds, as against 204 pounds in 1905.

Statistics of the total annual sales of natural rock and Portland cement since 1887 are shown in the following table:—

## Annual Production of Cement.\*

Calendar Year.	Natural rock cement.		Portland cement.		Totals.	
	Barrels.	Value.	Barrels.	Value.	Barrels.	Value.
		\$		\$		\$
1887					69,843	81,909
1888					50,668	35,593
1889	90,474	69,790	Nil.	Nil.	90,474	69,790
1890	87,521	74,822	14,695	17,583	102,216	92,405
1891	90,846	103,479	2,633	5,082	93,479	108,561
1892	88,187	94,912	29,221	52,751	117,408	147,663
1893	126,673	130,167	31,924	63,848	158,597	194,015
1894	72,965	74,842	35,177	69,795	108,142	144,637
1895	66,219	60,795	62,075	112,880	128,294	173,675
1896	70,705	60,500	78,385	141,151	149,090	201,651
1897	85,450	65,393	119,763	209,386	205,213	275,273
1898	87,125	73,412	163,084	324,168	250,209	397,580
1899	147,387	119,308	255,366	513,983	396,753	633,291
1900	125,428	99,994	292,124	562,916	417,552	662,910
1901	133,328	94,415	317,066	565,615	450,394	660,030
1902	127,931	98,932	594,594	1,028,618	722,525	1,127,550
1903	92,252	74,655	627,741	1,150,592	719,993	1,225,247
1904	56,814	50,247	910,358	1,287,992	967,172	1,338,239
1905	14,184	10,274	1,346,548	1,913,740	1,360,732	1,924,014
1906	8,610	6,052	2,119,764	3,164,807	2,128,374	3,170,859
1907	5,775	4,043	2,436,903	3,777,328	2,441,868	3,781,371
1908	1,044	815	2,665,289	3,709,139	2,666,333	3,709,954
1909	0	0	4,067,709	5,345,802	4,067,709	5,345,802
1910	0	0	4,753,975	6,412,215	4,753,975	6,412,215
1911	0	0	5,692,915	7,644,537	5,692,915	7,644,537

\* Quantities sold or shipped.

The production of cement in 1911 was derived from twenty-four operating plants, having a total daily capacity of 28,810 barrels, the operating plants being distributed as follows: one in Nova Scotia using blast furnace slag; one in Manitoba making a natural Portland cement; one in British Columbia; three in Alberta; three in Quebec using limestone and clay; and fifteen in Ontario, of which twelve use marl and three limestone.

A comparison of the principal statistics for 1910 and 1911, showing the increases or decreases, as the case may be, is given in the next table.

# Comparison of Production, Sales, and Imports of Portland Cement in 1910 and 1911.

	1910.	1911.	Increase.	%	De-crease.	%
Cement sold.....Bls.	4,753,975	5,692,915	938,940	19.8		
Cement manufactured,....."	4,396,282	5,677,539	1,281,257	29.1		
Stock on hand Jan. 1....."	1,189,731	918,965			270,766	22.8
Stock on hand Dec. 31....."	832,038	903,589	71,551	8.6		
Value of cement sold.....\$	6,412,215	7,644,537	1,232,322	19.2		
Average price per barrel....."	1.35	1.34			0.01	0.9
Wages paid....."	1,409,715	2,103,838	694,123	49.2		
Men employed.....No.	2,220	3,010	790	35.6		
Imports of Portland cement...Bls.	349,310	661,916	312,606	89.5		
Value of cement.....\$	468,046	834,879	366,833	78.4		
Average price per barrel....."	1.34	1.26			0.08	5.9
Total consumption of cement in Canada.....Bls.	5,103,285	6,354,831	1,251,546	24.5		
No. of completed plants operated....	22	24	2	9.1		
Total daily capacity of operating plants as on Dec. 31.....Bls.	25,835	23,810	2,975	11.5		

The large increase in output and sales of cement has already been referred to. It will be observed that the stocks on hand December 31, 1911, were approximately 900,000 barrels. The average price per barrel at the mill for all plants practically remains unchanged, being \$1.34 in 1911. There was a considerable increase in the number of men employed and the total wages paid. The imports of Portland cement in 1911 show a very decided increase, nearly 90 per cent, over those of 1910. The average price per barrel of 350 pounds of imported cement shows, however, a falling off of nearly 6 per cent, being \$1.26 in 1911, as compared with \$1.34 in 1910.

The increase in the number of operating plants and in total daily capacity is not due to the building of new plants, but rather to the resumption of operations at the Exshaw plant in Alberta, and the Point Ann plant of the Canada Cement Company at Belleville, Ontario, neither of which was operated during 1910.

Of the total quantity of cement made in 1911, 1,626,857 barrels were made from marl and 4,050,682 barrels from limestone and slag. In 1910, there were 1,214,479 barrels made from marl and 3,181,803 barrels from limestone and slag, and in 1909, 810,706 barrels were made from marl and 3,336,002 barrels from limestone and slag. Practically all of the newer plants erected during the past few years have been limestone plants. The proportion of cement made from



marl in 1908 was about 45 per cent of the total output, as compared with about 28 per cent in 1911.

Statistics of the annual production of Portland cement since 1897, showing the quantity made, the quantity sold, stocks on hand at the end of the year, value of sales, etc., are shown in the next table.

### Annual Production of Portland Cement.

Year.	Number of operating plants.	Quantity made.	Quantity sold.	On hand Dec. 31.	Value of sales.	Average per barrel.	Daily capacity.
		Barrels.	Barrels.	Barrels.	\$	\$ cts.	Barrels.
1897.....			119,763		209,380	1 75	
1898.....			163,084		324,168	1 99	
1899.....			255,366		513,983	2 01	
1900.....			292,124		562,916	1 91	
1901.....	4	360,160	317,066	58,094	565,615	1 78	
1902.....	8	562,335	594,594	33,446	1,028,618	1 73	3,900
1903.....	9	714,136	627,741	128,386	1,150,592	1 83	4,850
1904.....	10	908,990	910,358	112,051	1,287,992	1 41	
1905.....	13	1,541,568	1,346,548	306,466	1,913,740	1 42	8,000
1906.....	15	2,152,562	2,119,764	302,356	3,164,807	1 49	10,500
1907.....	17	2,491,513	2,436,093	354,435	3,777,328	1 55	14,400
1908.....	23	3,495,961	2,665,289	1,214,021	3,709,139	1 39	27,500
1909.....	22	4,146,708	4,067,709	1,777,238	5,345,802	1 31	23,050
1910.....	22	4,396,282	4,753,975	832,038	6,412,215	1 35	25,835
1911.....	24	5,677,539	5,692,915	903,589	7,644,537	1 34	28,810

*Imports and Exports.*—There has been very little cement exported from Canada during past years. The quantity is not shown in the export records of the Customs Department, but the value of the exports during 1911 was only \$4,067, as against a value of \$12,914 in 1910, and \$113,362 in 1909.

The imports of cement previous to 1901 were larger than Canadian production, but gave way steadily to the increasing domestic output until 1909, during which year the imports amounted to 142,194 barrels, or about 3 per cent of the total Canadian consumption. During the past two years there has been an increase in the importation of cement—the imports for 1911 being 661,916 barrels, as compared with 349,310 barrels in 1910. A duty of 12½ cents per 100 pounds general tariff is levied on cement, and 20 per cent on the value of bags containing the product. The British Preferential and Intermediate tariffs are reduced in proportion. The following items in the Customs tariff of 1907 cover the duty on cement:—

	British Preferential tariff.	Intermediate tariff.	General tariff.
Cement, Portland, and hydraulic or water lime, in barrels, bags, or casks, the weight of the package to be included in the weight for duty per hundred pounds.....	8 cents. ....	11 cents.....	12½ cents.
Bags in which cement or lime mentioned in the next preceding item is imported.....	15 per cent....	20 per cent....	20 per cent.

The duty on cement alone is equivalent to  $43\frac{3}{4}$  cents per barrel of 350 pounds net, and as bags are valued at 10 cents each, there is a further additional duty of 8 cents per barrel, making a total of  $51\frac{3}{4}$  cents. As the weight of the bag is included in taking the weight for duty, the general rate will be practically 52 cents per barrel.

The United States was the principal source of imports during the past two years, supplying about 66 per cent of the imports in 1911, as compared with about 29 per cent from Great Britain.

The imports of cement during 1910 and 1911, by countries, are shown in the next table:—

### Imports of Cement.

	1910.			1911.		
	Cwt.	%	Value.	Cwt.	%	Value.
			\$			\$
Great Britain.....	433,578	35.5	130,951	666,771	28.8	210,839
United States.....	591,403	48.4	253,463	1,544,612	66.7	575,768
Belgium.....	66,595	5.4	20,618	9,389	0.4	2,018
Other countries.....	131,010	10.7	63,014	18,727	0.8	7,962
Hong Kong.....	(a).....			77,208	3.3	38,292
Totals.....	1,222,586	100.0	468,046	2,316,707	100.0	834,879
Equivalent in barrels of 350 lbs..	349,310			661,916		

(a) In 1910 included "in other countries."

Statistics of the exports of cement since 1891 and of the imports since 1880 are given in the next two tables:—

### Exports of Cement.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1891.....	2,881	1898.....	2,117	1905.....	3,143
1892.....	938	1899.....	2,733	1906.....	7,551
1893.....	1,172	1900.....	3,296	1907.....	9,618
1894.....	482	1901.....	1,514	1908.....	34,591
1895.....	937	1902.....	2,267	1909.....	113,362
1896.....	1,328	1903.....	2,851	1910.....	12,914
1897.....	644	1904.....	5,494	1911.....	4,067

## Imports of Cement into Canada.

Fiscal Year.	Cement and Mfrs. of, N.E.S.*	Hydraulic cement.		Portland cement.	
		Barrels.	Value.	Barrels.	Value.
	\$		\$		\$
1880.....	28	10,034	10,306		55,774
1881.....	298	7,812	7,821		45,646
1882.....	86	11,945	13,410		66,579
1883.....	548	11,659	13,755		102,537
1884.....	1,236	8,606	9,514		102,857
1885.....	1,315	5,613	5,396		111,521
1886.....	1,851	6,164	6,028		120,398
1887.....	1,419	6,160	8,784	102,750	148,054
1888.....	5,787	5,636	7,522	122,402	177,158
1889.....	10,668	5,835	7,467	122,273	179,406
1890.....	5,443	5,440	9,048	192,322	313,572
1891.....	2,890	3,515	6,152	183,728	304,648
1892.....	3,394	2,214	2,782	187,233	281,553
1893.....	2,909	4,896	8,060	229,492	316,179
1894.....	2,618	1,054	985	224,150	280,841
1895.....	2,112	5,333	7,001	196,281	242,813
1896.....	3,672	5,688	8,948	204,407	242,409
1897.....	4,318	2,494	3,937	210,871	252,587
		Cwt.		Cwt.	
1898.....	3,263	16,033	7,097	1,073,058	355,264
1899.....	8,929	1,678	694	1,300,424	467,994
1900.....	10,452	10,418	4,711	1,301,361	498,607
1901.....	4,890	17,784	6,865	1,612,432	654,595
1902.....	12,234	29,585	17,755	1,971,616	833,657
1903.....	16,281	13,690	6,333	2,316,853	868,131
1904.....	14,305	12,088	5,391	2,476,388	995,017
1905.....	18,489	16,961	10,690	4,228,394	1,234,649
1906.....	27,858	10,794	4,034	2,848,582	963,839
1907.....	16,201	1,192	685	1,551,493	523,120
1908.....	12,418	18,860	6,710	2,427,381	852,041
1909.....	5,733	438	466	1,460,850	475,676
1910.....	7,678	588	553	490,809	158,487
1911.....	6,275	389	365	1,283,121	494,081

\* Cement not elsewhere specified and manufactures of cement.

*Consumption of Cement.*—The consumption of cement is represented practically by the domestic production together with the imports, the exports being so comparatively small as to be negligible. The total consumption of Portland cement in Canada in 1911 was 6,354,831 barrels (1,112,095 tons), made up of 5,692,915 barrels (996,260 tons) of Canadian cement, and 661,916 barrels (115,835 tons) of imported cement; the Canadian cement representing 90 per cent and the imported cement 10 per cent of the total.

In 1910 the total consumption of cement was 5,103,285 barrels (893,075 tons), of which 93 per cent was of domestic production and 7 per cent imported. In 1901 the total consumption was 872,966 barrels (152,769 tons), of which only 36 per cent was made in Canada and 64 per cent imported. The following is an estimate of the annual consumption of Portland cement in Canada during the past eleven years:—

## Annual Consumption of Portland Cement.

Calendar Year.	Canadian.		Imported.		Total.
	Barrels.	%	Barrels.	%	Barrels.
1901.....	317,066	36	555,900	64	872,966
1902.....	594,594	52	544,954	48	1,139,548
1903.....	627,741	45	773,678	55	1,401,419
1904.....	910,358	54	784,630	46	1,694,988
1905.....	1,346,548	59	918,701	41	2,265,249
1906.....	2,119,764	76	665,845	24	2,785,609
1907.....	2,436,093	78	672,630	22	3,108,723
1908.....	2,665,289	85	469,049	15	3,134,338
1909.....	4,067,709	97	142,194	3	4,209,903
1910.....	4,753,975	93	349,310	7	5,103,285
1911.....	5,692,915	90	661,916	10	6,354,831

*Nova Scotia.*—There is only one cement plant in Nova Scotia located at Sydney and operated by the Sydney Cement Company, Limited. Puzzolan cement is made from a mixture of blast furnace slag and lime. The capacity of the mill is about 500 barrels per day of twenty-four hours.

*Quebec.*—This Province has three cement mills all operated by the Canada Cement Company, Limited: two situated near Montreal at Longue Pointe and Point aux Trembles, and the third at Hull. The Montreal mills have a combined capacity of 5,300 barrels per day, and the Hull mill, 2,000 barrels. The quantity of cement sold or used during 1911 was 1,614,730 barrels, valued at \$1,963,439.

*Ontario.*—Ontario is the most important cement producing province, having 15 mills, of which 6, with a total daily capacity of 9,200 barrels, are operated by the Canada Cement Company, and 9 mills, having a total daily capacity of 6,550 barrels, by independent companies. Four plants are operated on limestone and have a daily capacity of 6,800 barrels, while 11 plants with an aggregate daily capacity of 8,950 barrels are utilizing marl deposits.

The names of the operating companies and location of plants are shown in the list of cement producers following.

The total sales of cement in Ontario during 1911 were 3,090,786 barrels, valued at \$3,741,039, as compared with 2,504,650 barrels, valued at \$3,150,479, sold in 1910.

The detailed statistics of production during 1910 and 1911 are shown in the next table.



## Cement Production in Ontario, 1910 and 1911.

		1910.	1911.	Increase.	%	Decrease.	%
Cement sold .....	Bls.	2,504,650	3,090,786	586,136	23·4		
Cement manufactured....	"	2,496,200	2,973,958	477,758	19·1		
Stock on hand Jan. 1....	"	600,971	682,598	81,627	13·6		
Stock on hand Dec. 31....	"	592,521	565,770			26,751	4·5
Value of cement sold....	\$	3,150,479	3,741,039	590,560	18·7		
Wages paid.....	"	743,213	945,971	202,758	27·3		
Men employed.....	No.	1,306	1,464	158	12·1		
Total daily capacity of operating plants....	Bls.	15,300	15,750	456	29·4		

*Manitoba.*—There is as yet only one cement plant in this Province, located at Babcock, 75 miles southwest of Winnipeg on the Canadian Northern railway.

This plant is operated by the Commercial Cement Company of Winnipeg, and a natural Portland cement is manufactured. The capacity of the plant is about 216 barrels a day. The Canada Cement Company is also constructing near Winnipeg a grinding plant, in which it is proposed for the present to grind clinker produced in the Company's plants in Ontario.

*Alberta.*—Alberta has three cement plants, located at Exshaw, Calgary, and Blairmore, respectively. All three plants are operated on limestone and shale. The first two, operated by the Canada Cement Company, have an aggregate daily capacity of 2,800 barrels. The Rocky Mountains Cement Company is doubling the capacity of its Blairmore plant, which in 1911 was 500 barrels per day; while the Keystone Portland Cement Company is erecting a mill at the same place.

*British Columbia.*—The Tod Inlet plant of the Vancouver Portland Cement Company, Limited, near Victoria, B.C., with a capacity of 2,250 barrels per day, is as yet the only operating plant in British Columbia. Limestone and clay are obtained from the Company's property adjoining the works.

At Princeton, B.C., the British Columbia Portland Cement Company, Limited, is constructing a plant with capacity of from 500 to 700 barrels per day.

The Portland Cement Construction Company of London, England, has also commenced the erection of a new cement plant at Tod Inlet.

The production of cement in Ontario has already been shown separately, and the aggregate production in all other provinces during 1910 and 1911 is given in the next table:—



## Cement Production in other Provinces, 1910 and 1911.

—		1910.	1911	Increase.	%	Decrease.	%
Cement sold.....	Bls.	2,249,325	2,602,129	352,804	15.7		
Cement manufactured....	"	1,900,082	2,703,581	803,499	42.3		
Stock on hand Jan. 1....	"	588,760	236,367			352,393	59.9
Stock on hand Dec. 31....	"	239,517	337,819	98,302	41.0		
Value of cement sold....	\$	3,261,736	3,903,498	641,762	19.7		
Wages paid.....	"	666,502	1,157,867	491,365	73.7		
Men employed.....	No.	914	1,546	632	69.1		
Total daily capacity of operating plants....	Bls.	10,535	13,060	2,525	23.9		

Following is a list of cement manufacturing companies:—

Name.	Location of plant.	Head office.
Sydney Cement Company, Ltd.....	Sydney, N.S. ....	Sydney, N.S.
Canada Cement Company, Ltd.....	Longue Pointe, Que....	Montreal, Que.
Montreal Mill No. 1.....	Pointe Aux Trembles, Q.	
Montreal Mill No. 2.....	Hull, Que.	
International Mill.....	Shallow Lake, Ont.....	
Owen Sound Mill.....	Belleville, O. (Point Ann)	
Belleville Mill.....	"	
Lehigh Mill.....	Lakefield, Ont.....	
Lakefield Mill.....	Marlbank, Ont.....	
Marlbank Mill.....	Port Colborne, Ont.....	
Port Colborne Mill.....	Calgary, Alta.....	
Alberta Mill.....	Exshaw, Alta.....	
Exshaw Mill.....	Owen Sound, Ont.....	Owen Sound, Ont.
Grey & Bruce Portland Cement Co. (assigned.)	" " " " " "	" " " "
The Sun Portland Cement Co., Ltd.....	" " " " " "	" " " "
The Imperial Cement Co. Ltd.....	Hanover, Ont.....	Hanover, Ont.
Hanover Portland Cement Co., Ltd.....	Blue Lake, Ont.....	Brantford, Ont.
The Ontario Portland Cement Co., Ltd.....	Durham, Ont.....	Durham, Ont.
The National Portland Cement Co., Ltd.....	Raven Lake, Ont.....	Toronto, Ont.
Kirkfield Portland Cement Co., Ltd.....	Orangeville, Ont.....	Orangeville, Ont.
Superior Portland Cement Co., Ltd.....	Atwood, Ont.....	Listowel, Ont.
The Maple Leaf Portland Cement Co., Ltd.....	Warton, Ont.....	Warton, Ont.
The Crown Portland Cement Co., Ltd.....	Babcock, Man.....	Winnipeg, Man.
The Commercial Cement Co., Ltd.....	Blairmore, Alta.....	Calgary, Alta.
The Rocky Mountains Cement Co.....	Tod Inlet, B.C. ....	Victoria, B.C.
Vancouver Portland Cement Co.....		

The following companies are engaged in the construction of or contemplating the erection of mills:—

Ben Allan Portland Cement Co.....	Owen Sound, Ont.
Lake Medal Portland Cement Co. ....	Hamilton, Ont.
The Brant Portland Cement Co.....	Brantford, Ont.
The Edmonton Portland Cement Co. ....	Edmonton, Alta.
The Keystone Portland Cement Co.....	Calgary, Alta.
British Columbia Portland Cement Co.....	Princeton, B.C.
The Portland Cement Construction Co.....	Tod Inlet, B.C.....

## CLAY PRODUCTS.

The actual production and sale of clay as such in Canada is as yet very small and practically limited to a small quantity of fireclay sold by a few operators. With this exception, all of the clay production in Canada is manufactured by the producer, and this report, therefore, treats almost altogether of the manufactured product.

The clay products made in Canada comprise brick of various kinds, including common and pressed, ornamental and fancy building brick, paving brick, firebrick, porous fireproofing brick and blocks, sewerpipe and drain tile, pottery and sanitary ware, the last two products chiefly from imported clays.

The production of clay products has been rapidly increasing, the value of the output having almost doubled in three years. The total value of the production in 1911 was \$8,359,933, as compared with a value of \$7,629,956 in 1910, showing an increase of \$729,977, or over 9.5 per cent.

While the increase in gross output was not as large as that shown in 1910, the industry apparently made very satisfactory progress during the year. Demand in most districts exceeded supply and higher prices generally were realized. For the year 1911 about 419 active firms reported, as against 438 active firms reporting for 1910. A larger number of men were, however, employed in 1911, an average of 9,131 being engaged, as compared with 8,656 in 1910; while the wages paid were \$3,524,058 in 1911, as against \$3,308,609 in 1910.

Considered by provinces, Ontario in 1911 had the largest output, being credited with 47 per cent of the total value. Quebec was second with 16 per cent, Alberta third with 12½ per cent, Manitoba fourth with 10 per cent, followed by British Columbia with 8 per cent.

In 1907, Ontario contributed 54 per cent of the production of clay products, while the western provinces contributed only 21 per cent, as against over 33 per cent in 1911.

Of the total value of production in 1911, building and paving brick, including fireproofing, contributed \$6,915,792, or nearly 84 per cent; sewerpipe and tile production were valued at \$1,152,528, or about 14 per cent of the total. The total value of the production of pottery was reported as \$439,264, of which \$102,493 is estimated as being attributable to Canadian clays and the balance to imported clays; the value of production of fireclay and firebrick was \$89,130. Compared with the previous year, the production of building, paving, and fireproofing brick shows an increase of nearly 12 per cent, while the production of sewerpipe and drain tile increased less than one per cent.

The average price of common building brick for the whole of Canada in 1911 was \$8.37, as compared with \$8.13 in 1910 and \$7.81 in 1909. The average price of pressed or front brick for the same years was, respectively, \$12.53, \$11.89, and \$11.01, thus showing the general increase in cost of building brick.

A comparison of statistics of imports of clay products shown in the table following, with those of production, is worth special attention. It will be noted in the first place that the total value of the imports in 1911 was at least \$5,156,544 (certain items probably covering clay products not being included), showing a total approximate consumption of clay products valued at \$13,416,537, of which only 62 per cent was of domestic production.

In 1909 the approximate consumption was valued at \$9,172,995, of which about 70 per cent was of domestic production.

In the case of building brick, the imports while increasing rapidly are still small compared with the home production; it is different, however, with paving brick and firebrick. The imports of paving brick in 1911 were over twice, and the imports of firebrick nearly ten times the Canadian output.

While the production of sewerpipe and drain tile remained nearly stationary, the imports of these products more than doubled in 1911, and amounted in value to about one-third the domestic production.

Statistics of the production in 1911 of the several classes of clay products by provinces are shown in the next table, and of the total production for a number of years past in subsequent tables following:—

## Production of Clay Products by Provinces, 1911.

Province.	No. of ac- tive firms reporting.	No. of men employed.	Wages. \$	Common brick.				Pressed brick.			
				No. manu- factured.	No. sold.	Value of sales. \$	Per M. \$ cts.	No. manu- factured.	No. sold.	Value of sales. \$	Per M. \$ cts.
Nova Scotia.....	13	336	97,513	22,300,000	22,680,000	133,540	5 88	850,000	850,000	8,100	9 52
New Brunswick.....	6	126	24,091	4,811,470	4,300,000	36,800	5 55	100,000	100,000	1,200	12 00
Quebec.....	60	1,402	417,882	129,256,700	110,701,580	849,654	7 67	14,577,000	11,340,000	183,616	16 20
Ontario.....	262	4,366	1,727,478	335,221,526	318,670,621	2,513,965	7 89	51,990,204	50,333,750	514,081	10 21
Manitoba.....	18	1,210	435,228	83,362,000	79,600,000	805,178	10 11	1,800,000	1,800,000	21,750	12 08
Saskatchewan.....	13	303	105,507	17,824,260	16,819,960	159,634	9 49	4,726,700	4,251,700	65,124	15 31
Alberta.....	28	782	324,868	58,064,710	56,943,955	574,243	10 10	14,752,734	14,828,975	204,758	13 81
British Columbia.....	19	606	388,491	37,816,308	35,834,401	347,876	9 70	5,373,647	3,846,114	95,953	24 94
Totals.....	419	9,131	3,524,058	688,656,974	645,550,517	5,420,890	8 37	94,170,285	87,350,539	1,094,582	12 53

Province.	Paving brick.		Ornamental.		Firebrick and fireclay shapes, Value.	Fireproof- ing and terra-cotta, etc., Value.	Pottery, Value.	Sewerpipe, Value.	Tiles, drain, Value.	Total value, Clay products.
	No. sold.	Value.	No. sold.	Value.						
Nova Scotia.....		\$		\$	15,207	11,256	1,800	98,946	5,400	\$ 274,249
New Brunswick.....										38,000
Quebec.....					18,000	76,199	59,400	150,303	455	1,341,467
Ontario.....	5,220,400	79,444	413,643	7,441		51,080	41,293	409,242	300,029	3,916,575
Manitoba.....									7,500	834,428
Saskatchewan.....					2,200					226,958
Alberta.....						270,750			3,000	1,052,751
British Columbia.....					53,723	300		154,225	23,428	675,505
Totals.....	5,220,400	79,444	605,643	1,281	89,130	409,585	*102,493	812,716	339,812	8,359,933

\* There was also a production of \$336,771 from imported clays.



## Production of Clay Products, 1909 and 1910.

	1909.			1910.		
	Quantity.	Value.	Per M.	Quantity.	Value.	Per M.
Bricks—		\$	\$ cts.		\$	\$ cts.
Common . . . . . No.	539,228,708	4,212,424	7 81	627,715,319	5,105,354	8 13
Pressed . . . . . "	57,264,656	630,677	11 01	67,895,034	807,294	11 89
Paving . . . . . "	3,759,803	67,408	17 93	4,214,917	78,980	18 74
Ornamental . . . . .		8,866		703,345	16,092	22 89
Firebrick and fireclay shapes, etc. . . . .		78,132			50,215	
Fireproofing, and architectural terra-cotta, etc. . . . .		113,886			176,979	
Pottery . . . . .		285,285			250,924	
Sewerpipe . . . . .		645,722			774,110	
Tiles, drain . . . . .	27,571,097	408,440	14 81	24,562,648	370,008	
Totals . . . . .		6,450,840			7,629,956	

## Production of Clay Products by Provinces, 1906-1911.

Province.	1906.	1907.	1908.	1909.	1910.	1911.
	\$	\$	\$	\$	\$	\$
Nova Scotia . . . . .	160,506	125,560	117,833	188,185	204,782	274,249
New Brunswick . . . . .	49,220	57,377	75,513	65,570	56,475	38,000
Quebec . . . . .	769,458	1,214,108	893,717	1,153,832	1,442,842	1,341,467
Ontario . . . . .	3,136,870	3,123,372	2,476,152	3,425,841	3,667,810	3,916,575
Manitoba . . . . .	517,065	466,432	265,091	559,008	781,605	834,428
Saskatchewan . . . . .	136,022	125,459	87,566	145,516	160,850	226,958
Alberta . . . . .	180,217	353,672	240,384	442,486	753,232	1,052,751
British Columbia . . . . .	123,277	306,137	344,446	470,402	562,360	675,505
	5,072,635	5,772,117	4,500,702	6,450,840	7,629,956	8,359,933

## Annual Value of Production of Clay Products, 1899-1911.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1899 . . . . .	2,988,099	1904 . . . . .	3,841,560	1909 . . . . .	6,450,840
1900 . . . . .	3,195,105	1905 . . . . .	4,709,842	1910 . . . . .	7,629,956
1901 . . . . .	3,382,706	1906 . . . . .	5,072,635	1911 . . . . .	8,359,933
1902 . . . . .	3,625,489	1907 . . . . .	5,772,117		
1903 . . . . .	4,034,289	1908 . . . . .	4,500,702		

*Exports and Imports.*—The only export of clay products recorded is that of building brick, of which the exports in 1911 were 394,000, valued at \$3,977, as compared with 390,000, valued at \$2,762, in 1910, and 365,000, valued at \$2,255, in 1909.



The imports of clay products and of clay are, on the other hand, as already pointed out, quite considerable, and amounted in total value during the calendar year 1911 to \$5,156,544, equivalent to about 62 per cent of the domestic production. The total imports in 1910 were valued at \$4,331,397, showing an increase in 1911 of \$825,147, or 19 per cent, as against an increase in 1910 over 1909 of 33 per cent. In both years the imports have increased at a higher rate than the domestic production. Clay imports are classified by the Department of Customs under three main subdivisions: clays, brick and tile, and earthenware and chinaware. The imports of clays in 1911 were valued at \$270,247, and included chiefly china-clay and fireclay with a small quantity of pipeclay, and other clays not classified. The value of china-clay imports was \$125,768, and of fireclay, \$125,199. The imports of these clays have varied considerably from year to year, and do not show the same general increase as do the imports of manufactured clays. A reference to the next table will show the changes since 1905. The imports classified under brick and tile were valued in 1911 at \$2,369,761, of which about 34 per cent was firebrick, other important items being building brick, sewerpipe, and paving brick. There was also an importation under this class of manufactures of clay not specifically designated, valued at \$523,998. The imports of these 'unclassified' brick and tile have increased steadily year by year, the value of such imports in 1905 having been only \$20,804. The total imports of brick and tile in 1910 were valued at \$1,755,773, showing an increase in 1911 of about 35 per cent. The imports of earthenware and chinaware, of which the most important class is tableware, were valued in 1911 at \$2,516,536, as against \$2,283,116, an increase of about 10 per cent.

The detailed record of imports since 1905 is shown in the next table, the figures for the years 1905 to 1909 covering the fiscal year, and for the last three years the calendar year is used.

## Imports of Clay Products, 1905 to 1911.

Imports.	12 months ending June, 1905.	12 months ending June, 1906.	9 months ending March, 1907.	12 months ending March, 1908.	12 months ending March, 1909.	Calendar year 1909.	Calendar year 1910.	Calendar year 1911.
	\$	\$	\$	\$	\$	\$	\$	\$
Brick and tile :—								
Bath brick.....	916	1,466	1,076	1,834	4,432	1,495	2,290	2,623
Building brick.....	168,122	194,897	88,144	129,105	108,773	195,360	274,482	475,865
Paving brick.....	32,578	46,008	23,256	61,346	101,187	139,366	124,994	164,292
Firebrick, of a class or kind not made in Canada..	*436,941	*591,854	*506,801	639,347	350,457	435,994	811,927	814,414
Drain tile, not glazed.....	1,229	4,727	12,106	2,080	2,394	2,785	4,485	5,640
Drain pipe, sewerpipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed.....	101,166	131,353	93,458	125,747	106,399	170,280	175,599	382,929
Manufactures of clay, N.O.P.....	20,804	30,067	45,845	110,097	141,391	254,170	361,996	523,998
Total.....	761,756	1,000,372	770,686	1,079,556	815,033	1,249,450	1,755,773	2,369,761
Earthenware and chinaware :—								
Brown or coloured earthenware and stoneware, and Rockingham ware.....	15,464	8,363	9,625	22,847	28,273	36,673	53,413	52,100
C. C. or cream coloured ware, decorated, printed or sponged, and all earthenware, N.O.P.....	169,102	191,552	154,879	239,513	197,623	219,936	202,475	184,291
Demijohns, churns, or crocks.....	8,158	10,508	9,342	17,836	10,571	8,888	6,607	4,933
Tableware of china, porcelain, white granite or iron- stoneware.....	1,033,171	1,004,024	902,798	1,555,517	1,202,537	1,212,365	1,545,538	1,718,582
China and porcelain ware, N.O.P.....	199,960	214,013	134,675	109,446	87,798	87,467	95,509	62,025
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....	65,181	78,247	62,547	45,836	43,299	56,974	90,524	123,20
Earthenware tiles, N.O.P.....	71,609	117,824	67,027	116,480	79,854	81,393	125,772	154,351
Manufacture of earthenware, N.O.P.....	1,562,645	1,624,531	1,422,880	2,190,784	1,716,887	1,781,759	2,283,116	2,516,536
Total.....	1,562,645	1,624,531	1,422,880	2,190,784	1,716,887	1,781,759	2,283,116	2,516,536

# Imports of Clay Products, 1905 to 1911—Continued.

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Imports.	12 months ending June, 1905.	12 months ending June, 1906.	9 months ending March, 1907.	12 months ending March, 1908.	12 months ending March, 1909.	Calendar year 1910.	Calendar year 1911.
Clays:—							
China-clay, ground or unground.....	\$ 94,501	\$ 65,909	\$ 78,772	\$ 97,236	\$ 100,066	\$ 142,125	\$ 125,768
Fired-clay, ground or unground....	73,837	131,130	85,044	155,873	86,161	124,293	125,199
Pipe-clay, ground or unground.....	1,189	1,333	307	319	310	114	1,786
Clays, all other, N.O.P.....	7,278	22,132	14,117	14,292	29,793	25,376	17,494
Total.....	176,805	220,504	178,240	267,720	216,330	292,508	270,247
Grand total. ....	2,501,206	2,845,407	2,371,806	3,538,060	3,247,539	4,331,397	5,156,544
Baths, bath-tubs, basins, closets, lavatories, urinals, sinks and laundry tubs of any material.....	73,569	67,828	62,547	234,505	211,837	262,667	235,847
Chalk, china or corn-wall stone, cliff stone and fieldspar, fluorspar, magnesite, ground or unground.....	5,276	9,053	7,376	72,467	96,747	121,959	147,640

\* Includes stove linings, N. E. S.

In addition to the imports shown in the above table, there is also a considerable annual importation of 'chalk, china or cornwall stone, cliff stone and feldspar, fluorspar, magnesite ground or unground,' much of which is no doubt used in connexion with the manufacture of clay products. The value of these imports during the calendar year 1911 was \$147,640: of which \$90,119 was from the United States, \$54,548 from Great Britain, and \$2,973 from other countries. The value of the imports under this item during the calendar year 1910 was \$121,959. There is also an annual importation of 'baths, bath tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material,' the value of such imports during 1911 being \$285,847, as compared with \$262,667 during the year 1910.

Imported clay products are derived chiefly from Great Britain and the United States, although considerable quantities of earthenware, china, and porcelain ware, white granite or ironstoneware, etc., are brought from Germany, France, Austria-Hungary, and Japan. The imports during the fiscal year, showing the country of origin, are shown in the next table. Of the brick and tile imported, 76.7 per cent was from the United States and 23.2 per cent from Great Britain; and only \$578 worth from other countries. Of the earthenware and chinaware, 62 per cent was imported from Great Britain; 15 per cent from the United States; 9 per cent from Germany; 7 per cent from France, and considerable values also from Japan, Austria-Hungary, and other countries. The crude clays were imported principally from Great Britain and the United States.

## Imports of Clay Products during the twelve months ending March, 1911, showing Countries of Origin.

Imports.	Great Britain.	United States.	Germany.	France.	Austria-Hungary.	Japan.	Other countries.	Total.
	£	\$	£	£	£	£	£	£
Brick and tile:—								
Bath brick.....	2,250	17						2,267
Building brick.....	30,837	278,716						309,553
Paving brick.....	94,885	35,976						130,861
Firebrick, of a class or kind not made in Canada.....	73,128	791,202					135	864,465
Drain tile, not glazed.....	305	4,073						4,378
Drain pipe, sewerpipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed.....	23,179	151,283	191					174,653
Manufactures of clay, N.O.P.....	216,950	191,822	194	29	17		12	409,024
Total.....	441,534	1,453,089	385	29	17		147	1,895,201
Earthenware and chinaware:—								
Brown or coloured earthenware and stoneware, and Rockingham ware.....	13,747	39,728	718	90		123		54,406
C. C. or cream coloured ware, decorated, printed or sponged, and all earthenware, N.O.P.....	112,956	46,260	12,892	2,186	2,438	12,949	1,829	191,510
Demijohns, churns, or crocks.....	1,622	5,615						7,237
Tableware of china, porcelain, white granite or ironstone ware.....	1,133,279	29,893	174,405	157,525	47,446	69,525	28,162	1,640,035
China and porcelain ware, N.O.P.....	44,866	18,330	15,869	2,330	4,893	3,975	4,312	94,575
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....	24,216	66,057	13	3,448			150	93,884
Earthenware tiles, N.O.P.....	85,489	50,032	236	566			162	136,485
Manufacture of earthenware, N.O.P.....	60,143	95,983	15,539	2,606	1,026	3,399	1,588	180,284
Total.....	1,476,318	351,898	219,672	108,551	55,803	89,971	36,203	2,398,416



Imports of Clay Products during the twelve months ending March, 1911, showing Countries of Origin—Continued.

Imports.	Great Britain.	United States.	Germany.	France.	Austria-Hungary.	Japan.	Other Countries.	Total.
	\$	\$	\$	\$	\$	\$	\$	\$
Clays:—								
China-clay, ground or unground. ....	110,432	34,472						144,904
Fired-clay, ground or unground. ....	25,218	103,811					699	129,728
Pipe-clay, ground or unground. ....	100	156						256
Clays, all other, N.O.P. ....	486	23,660	499					24,645
Total ....	136,236	162,099	499				699	299,533
Grand total .....	2,054,088	1,967,086	220,556	168,580	55,820	89,971	37,049	4,593,150
Per cent of total. ....	44.72	42.83	4.80	3.67	1.21	1.96	0.81	100.00
Baths, bath-tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material. ....	65,332	195,218	160		11		13	260,734
Chalk, china or cornwall stone, cliff stone, and feldspar, fluorspar, magnesite, ground or unground. ....	27,550	89,846	856	332	152		1,945	120,681

A record of the total annual value of the imports of clay products since 1900 by fiscal years is shown in the following table. In twelve years Canada has imported clay products to the value of \$30,093,888. The increase in imports has been most pronounced in the case of brick and tile, the imports of which in 1900 amounted to \$145,914, as compared with \$1,895,201 in 1911. The imports of earthenware and chinaware have a little more than doubled in the same time.

### Imports of Clay Products (total value) 1900-11.

Fiscal Year.	Brick and tile.	Earthenware and chinaware.	Clays.	Total
	\$	\$	\$	\$
1900.....	145,914	959,526	122,965	1,228,405
1901.....	133,343	1,114,677	141,251	1,389,271
1902.....	172,281	1,275,093	140,521	1,587,895
1903.....	157,783	1,406,610	176,416	1,740,809
1904.....	259,421	1,611,356	144,706	2,015,483
1905.....	761,756	1,636,214	176,805	2,574,775
1906.....	1,000,372	1,692,359	220,504	2,913,235
1907*.....	770,686	1,422,880	178,240	2,371,806
1908.....	1,079,556	2,190,784	267,720	3,538,060
1909.....	815,033	1,716,887	190,235	2,722,155
1910.....	1,341,310	1,859,302	218,232	3,418,844
1911.....	1,895,201	2,398,416	299,533	4,593,150
	8,532,656	19,284,104	2,277,128	30,093,888

\*9 months ending March 1907.

\*\* Includes fireclay classified as "for use in process of manufactures."

In view of the large import of clay products into Canada, it may be of interest to quote herewith the Customs duties affecting these goods.

### Canadian Customs Duties on Clay Products.

(From the Customs Tariff, 1907, revised 1910).

Item.		British Preferential tariff.	Intermediate tariff.	General tariff.
281	Firebrick of a class or kind not made in Canada.....	Free.	Free.	Free.
282	Building brick, paving brick, and mfgs. of clay or cement (N.O.P.).....	12½ %	20 %	22½ %
283	Drain tiles not glazed.....	15 "	17½ "	20 "
284	Drain pipes, sewerpipes, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed, earthenware tiles (N.O.P.).....	25 "	32½ "	35 "
285	Tiles or blocks of earthenware or of stone prepared for mosaic flooring.....	20 "	27½ "	30 "
286	Earthenware and stoneware, viz., demijohns, churns, or crocks.....	20 "	27½ "	30 "
287	Tableware of china, porcelain, white granite or iron-stone.....	15 "	27½ "	27½ "
288	Earthenware and stoneware, brown or coloured, and Rockingham ware "C.C." or cream coloured ware, decorated, printed or sponged, and all earthenware (N.O.P.).....	20 "	27½ "	30 "
289	Closets, urinals, basins, lavatories, baths, bath tubs, sinks, and laundry tubs of earthenware, stone, cement or clay or of other material.....	20 "	30 "	35 "
295	Clays, including china-clays, fireclay and pipe-clay, not further manufactured than ground; ganister and sand; gravels; earths, crude only.....	Free.	Free.	Free.

*Clay Building Brick.*—The total production of clay building brick, including the common and pressed varieties, but excluding ornamental, paving, fire-brick, and fireproofing brick, is shown by provinces for the past two years in the following tables.

In 1911 the total sales were 732,901,056, valued at \$6,515,472, made up of 645,550,517 common, valued at \$5,420,890, or an average value per thousand of \$8.37; and 87,350,539 pressed brick, valued at \$1,094,582, or an average value per thousand of \$12.53. In addition to the common and pressed brick there was a production of ornamental brick of 605,643, valued at \$11,281, and a production of fireproofing brick and architectural terra-cotta valued at \$409,585.

In 1910 the production was 627,715,319 common brick, valued at \$5,105,354, or an average value per thousand of \$8.13; and 67,895,024 pressed brick, valued at \$807,294, or an average value per thousand of \$11.89; the total of the two classes being 695,610,353, valued at \$5,912,648. The production of ornamental brick in 1910 was 703,345, valued at \$16,092; and of fireproofing and architectural terra-cotta, \$176,979.

The increase in production of fireproofing has been particularly marked, and is due to the establishment of new plants, including the National Fire Proofing Company of Canada at Waterdown, Ont., and the Alberta Clay Products Company, Limited, of Medicine Hat, Alta.

The demand for brick has been very strong, particularly throughout the west, where numbers of plants are being increased in capacity and many new plants either contemplated or in course of construction.

### Production of Clay Building Brick (Common and Pressed) 1910 and 1911.

Province.	1910.				1911.			
	No. of active firms reporting.	No. sold.	Value.	Per cent of total value.	No. of active firms reporting.	No. sold.	Value.	Per cent of total value.
			\$				\$	
Nova Scotia. ....	15	18,730,000	113,436	1.92	13	23,530,000	141,640	2.17
New Brunswick. ....	4	3,950,000	31,350	0.53	6	4,400,000	38,000	0.58
Quebec. ....	62	130,278,310	929,492	15.72	60	122,041,580	1,033,270	15.86
Ontario. ....	235	342,119,078	2,785,361	47.11	262	369,034,371	3,028,046	46.48
Manitoba. ....	22	75,834,550	746,704	12.63	18	81,400,000	826,928	12.69
Saskatchewan. ....	11	14,733,340	160,850	2.72	13	21,071,660	224,758	3.45
Alberta. ....	29	73,639,771	750,982	12.70	28	71,772,930	779,001	11.96
British Columbia. ....	19	36,316,304	394,473	6.67	19	39,680,515	443,829	6.81
Totals. ....	397	695,610,353	5,912,648	100	419	732,901,056	6,515,472	100.00

## Production of Clay Building Brick (Common and Pressed) 1908 and 1909.

Province.	1908.			1909.		
	No. sold.	Value.	Per cent of total value.	No. sold.	Value.	Per cent of total value.
		\$			\$	
Nova Scotia.....	9,125,000	56,064	1.79	18,875,000	114,795	2.37
New Brunswick.....	6,594,011	54,573	1.74	6,170,000	44,330	0.91
Quebec.....	90,667,177	601,874	19.24	101,471,567	690,918	14.27
Ontario.....	221,600,575	1,664,184	53.19	322,524,414	2,557,068	52.80
Manitoba.....	26,818,000	254,591	8.14	59,110,000	544,548	11.24
Saskatchewan.....	8,262,996	87,566	2.80	14,416,770	144,316	2.98
Alberta.....	25,521,911	240,336	7.68	45,479,855	441,606	9.12
British Columbia.....	18,152,362	169,546	5.42	28,445,758	305,520	6.31
Totals .....	406,742,632	3,128,734	100.00	596,493,364	4,843,101	100.00

The exports and imports of building brick since 1891 and 1880, respectively, are shown in the two following tables. The exports have never been large, averaging for a number of years past about \$6,000 in value per annum, but falling in 1910 and 1911 to \$2,762 and \$3,977, respectively. The annual imports for a number of years previous to 1903 averaged only about \$20,000 in value. During the past eight years, however, the imports have rapidly increased from \$100,000 to nearly \$500,000 per annum. During the calendar year 1911 the imports were 51,102,000 brick, valued at \$475,865: of which 6,404,000, valued at \$72,675, or an average of \$11.35 per thousand, were imported from Great Britain; and 44,698,000, valued at \$403,190, or an average of \$9.02 per thousand, from the United States. The imports during the calendar year 1910 were 29,049,000 brick, valued at \$274,482: of which 1,993,000, valued at \$26,447, or an average of \$13.27 per thousand, were imported from Great Britain; and 27,056,000, valued at \$248,035, or an average of \$9.45 per thousand, from the United States.

## Exports of Building Brick.

Calendar Year.	M.	Value.	Calendar Year.	M.	Value.	Calendar Year.	M.	Value.
		\$			\$			\$
1891.....	246	1,163	1898.....	65	442	1905.....	754	5,888
1892.....	1,963	12,192	1899.....	172	1,351	1906.....	697	6,541
1893.....	6,073	44,110	1900.....	546	4,528	1907.....	802	6,193*
1894.....	1,095	7,405	1901.....	646	5,189	1908.....	2,344	9,047
1895.....	1,655	8,665	1902.....	2,110	12,786	1909.....	365	2,255
1896.....	933	5,678	1903.....	891	5,699	1910.....	390	2,762
1897.....	573	2,679	1904.....	696	5,357	1911.....	394	3,977



## Imports of Building Brick.

Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.
		\$			\$			\$
1880.....	340	2,067	1891.....	589	9,744	1902.....	4,087	33,802
1881.....	415	4,281	1892.....	621	5,075	1903.....	2,881	28,493
1882.....	3,500	24,572	1893.....	1,489	14,108	1904.....	13,455	117,468
1883.....	1,448	14,234	1894.....	2,220	18,320	1905.....	25,515	168,122
1884.....	3,263	20,258	1895.....	575	4,705	1906.....	21,934	194,897
1885.....	3,108	14,632	1896.....	1,057	23,189	1907 (9 mos.).	8,495	88,144
1886.....	983	5,929	1897.....	2,094	10,336	1908.....	13,790	139,105
1887.....	276	2,440	1898.....	639	6,652	1909.....	10,894	103,773
1888.....	2,483	20,720	1899.....	2,611	21,306	1910.....	30,444	218,175
1889.....	2,590	24,585	1900.....	1,792	19,305	1911.....	32,748	309,553
1890.....	1,933	12,500	1901.....	2,800	20,677			

*Prices.*—The price of brick varies greatly with the quality, locality, market, or demand. The values as given in the table of production are those at the yard or kiln and do not include costs of delivery. They do not, therefore, represent the price to the consumer. The average price of common brick at the kiln in 1911 according to these returns was \$8.37, as compared with \$8.13 in 1910, and \$7.81 in 1909; and of pressed brick \$12.53, as compared with \$11.89 in 1910 and \$11.01 in 1909.

In the Maritime Provinces, during 1911, the price of common brick varied from \$5 to \$9, averaging for Nova Scotia \$5.88, and for New Brunswick \$5.55.

In Quebec the price of common brick varied between \$4.50 and \$11, averaging \$7.67; while the price of pressed brick averaged \$16.20, with only one firm reporting production. The average price of common brick in Ontario was \$7.89, the limits of variation being \$5 and \$11; while for pressed brick the average was \$10.21 and the variation from \$8 to \$12.

In the western provinces the averages for common brick were fairly uniform—\$9.49 to \$10.11. In individual yards the prices varied from \$8 to \$12. Pressed brick in the west averaged \$12.08 per thousand in Manitoba; \$15.31 in Saskatchewan; \$13.81 in Alberta; and \$24.94 in British Columbia. With the exception of Saskatchewan, the average prices for pressed brick in the western provinces were all lower than in 1910.



The following table shows the average values at the kilns of common and pressed brick during 1909, 1910, and 1911, as furnished by the producers:—

**Average Prices per Thousand of Common and Pressed Brick.**

	Common brick.			Pressed brick.		
	1909.	1910.	1911.	1909.	1910.	1911.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Nova Scotia. ....	5 69	5 77	5 88	12 36	12 27	9 52
New Brunswick.. ....	7 14	7 83	5 55	12 00	12 00	12 00
Quebec.....	6 38	6 63	7 67	14 00	15 00	16 20
Ontario.....	7 71	7 88	7 89	9 46	9 74	10 21
Manitoba.....	9 14	9 81	10 11	12 00	16 27	12 08
Saskatchewan.....	9 66	9 63	9 49	14 00	14 97	15 31
Alberta.....	9 21	9 63	10 10	13 03	19 01	13 81
British Columbia.....	9 73	9 77	9 70	31 05	33 56	24 94
Canada.....	7 81	8 13	8 37	11 01	11 89	12 53

*Nova Scotia and New Brunswick.*—An increase is shown in the brick production of both these Provinces in 1911, the total production in Nova Scotia being 23,530 thousand, valued at \$141,640; and in New Brunswick, 4,400 thousand, valued at \$38,000. In addition to brick there was a production in Nova Scotia of fireproofing, terra-cotta, tile, etc., valued at \$11,256, and a production of pottery valued at \$1,800. The principal brick plants are located at Pugwash, Elmsdale, New Glasgow, Middleton, and Annapolis in Nova Scotia, and at Fredericton, St. John, and Chatham, New Brunswick.

*Quebec.*—The total production of brick in Quebec in 1911 is reported by sixty operative firms as 122,042 thousand, valued at \$1,033,270, comprising 110,702 thousand common brick, valued at \$849,654, or \$7.67 per thousand, and 11,340 thousand pressed brick, valued at \$183,616, or \$16.20 per thousand. The production by sixty-two active firms in 1910 was 130,287 thousand brick, valued at \$929,492.

The production of brick is widely scattered throughout the Province, but the principal brickmaking plants are located at Laprairie, Sherbrooke, and St. Jean Deschaillons.

*Ontario.*—This Province has for a number of years produced over 50 per cent of the clay building brick production in Canada, though the percentage in 1910 and 1911 has fallen to a little over 46. The city of Toronto and vicinity, including the counties of York and Halton, is the principal brick-making section, and in 1911 produced about 59 per cent of the Ontario production, or about 28 per cent of the total Canadian production of brick.

The district next in importance is the county of Wentworth, comprising the city of Hamilton and vicinity, producing over 7½ per cent of the Ontario production. The Ottawa district, including the counties of Russell and Carleton, produced over 6½ per cent. Other important districts are Algoma and Nipissing, which cover a wide area, and the counties of Waterloo, Middlesex, Grey, Simcoe, Essex, and Kent. These thirteen counties contributed over 86 per cent of the Ontario production. The greater part of the pressed brick reported as such was made in the Toronto and Hamilton districts.

### Production of Common and Pressed Brick by Principal Counties, 1911.

County.	Common.			Pressed.			Total value.	Per cent.
	No.	Value.	Per M.	No.	Value.	Per M.		
		\$	\$ c.		\$	\$ c.	\$	%
York.....	163,102,300	1,353,096	8 30	14,146,000	162,865	11 51	1,515,961	50·06
Halton.....	200,000	1,600	8 00	26,948,400	259,659	9 64	261,259	8·63
Wentworth.....	26,754,286	168,479	6 30	6,612,314	63,706	9 63	232,185	7·67
Carleton.....	11,975,000	109,369	9 13				109,369	3·61
Russell.....	15,850,500	96,353	6 08				96,353	3·18
Algoma.....	9,096,000	74,189	8 16				74,189	2·45
Waterloo.....	8,120,365	60,913	7 50				60,913	2·01
Nipissing.....	6,100,000	57,500	9 43				57,500	1·90
Middlesex.....	6,849,530	52,502	7 66				52,502	1·73
Grey.....	6,099,490	48,952	8 03				48,952	1·62
Simcoe.....	4,995,000	38,940	7 80				38,940	1·29
Essex.....	5,255,200	35,497	6 75	120,000	1,200	10 00	36,697	1·21
Kent.....	4,997,500	33,453	6 69				33,453	1·10
Total, 13 counties...	269,395,171	2,130,843	7 91	47,826,714	487,430	10 19	2,618,273	86·46
Total, other counties	49,275,450	383,122	7 77	2,507,036	26,651	10 63	409,773	13·54
Total, Ontario.....	318,670,621	2,513,965	7 89	50,333,750	514,081	10 21	3,028,046	100·00

The annual production of common and pressed brick in this Province since 1898, as ascertained by the Ontario Bureau of Mines, is shown in the following table. The figures differ only slightly from those reported directly to the Mines Branch:—

## Building Brick made in Ontario since 1898.

	Common brick.			Pressed brick.		
	M.	Value.	Average per M.	M.	Value.	Average per M.
		\$	\$ cts.		\$	\$ cts.
1898 .....	170,000	914,000	5.376	8,970	100,344	11.187
1899 .....	233,898	1,313,750	5.617	10,808	105,000	9.715
1900 .....	240,430	1,379,590	5.738	11,562	114,419	9.896
1901 .....	259,265	1,530,460	5.903	12,846	104,394	8.127
1902 .....	220,500	1,411,000	6.399	19,755	144,171	7.298
1903 .....	230,000	1,561,700	6.790	23,703	218,550	9.220
1904 .....	200,000	1,430,000	7.150	26,857	226,750	8.443
1905 .....	250,000	1,937,500	7.750	26,000	234,000	9.000
1906 .....	300,000	2,157,000	7.190	39,860	337,795	8.475
1907 .....	273,882	2,109,978	7.704	69,763	648,683	9.298
1908 .....	222,361	1,575,875	7.087	56,167	485,819	8.649
1909 .....	246,308	1,916,147	7.779	53,167	490,571	9.227
1910 .....	304,988	2,374,287	7.785	44,204	458,596	10.375
*1911 .....	316,000	2,480,177	7.845	51,844	562,345	10.847

\* Preliminary.

In addition to the ordinary building brick, there was produced in this Province in 1911, ornamental brick valued at \$7,441, and fireproofing and terracotta valued at \$51,080.

*Manitoba.*—The production of building brick in Manitoba in 1911 was 81,400 thousand, valued at \$826,928, comprising 79,600 thousand common brick, valued at \$805,178, or an average of \$10.11 per thousand; and 1,800 thousand pressed brick, valued at \$21,750, or \$12.08 per thousand. The total production in 1910 was 75,835 thousand, valued at \$746,704, showing an increase of over 10 per cent in the value of the production.

The principal brickmaking plants are located at Winnipeg, Morris, Lac du Bonnet, Portage La Prairie, Sidney, Brandon, Brookdale, Gilbert Plains, and Virden.

*Saskatchewan.*—Returns from thirteen operating firms show a production in 1911 of 21,072 thousand brick, valued at \$224,758, as compared with 14,733 thousand brick, valued at \$160,850, produced by eleven firms during 1910.

The principal clay plants are located at Estevan, Prince Albert, Saskatoon, Rosthern, Verigin, and Yorkton.

*Alberta.*—The production in 1911 reported by twenty-eight firms was 71,773 thousand, valued at \$779,001, as against 73,640 thousand, valued at \$750,982, reported by twenty-nine firms in 1910. The 1911 production included 56,944 thousand common brick, valued at \$574,243, or an average of \$10.10 per thousand, and 14,829 thousand pressed brick, valued at \$204,758, or an average of \$13.81 per thousand.

In addition to building brick, there was a production in this Province during 1911 of fireproofing valued at \$270,750.

The principal centres of production are Edmonton, Cochrane, Calgary, Medicine Hat, Lethbridge, and Red Deer.

Throughout the three prairie provinces the demand for brick was particularly heavy, and the prices of common ranged from \$8 to \$12 per thousand, while pressed brick sold at from \$14 to \$20 per thousand.

*British Columbia.*—The production during 1911 by nineteen active firms was 39,681 thousand brick, valued at \$443,829, and included 35,835 thousand common brick, valued at \$347,876, or an average of \$9.70 per thousand; and 3,846 thousand pressed brick, valued at \$95,953, or an average of \$24.94 per thousand. The total production by the same number of firms in 1910 was 36,316 thousand brick, valued at \$394,473. Vancouver, New Westminster, Port Haney and vicinity, Anvil Island, Victoria, and Sidney are the principal centres for the production of common brick, while pressed brick are made in considerable quantities at Clayburn and Anvil Island.

*Paving Brick.*—The total production of paving brick and paving blocks in Canada in 1911 was reported as 5,220,400, valued at \$79,444, as compared with a production of 4,215,000, valued at \$78,980 in 1910.

This paving brick is made at West Toronto, Ont., from shale obtained from the banks of the Humber river. The annual production has for a number of years varied from 3,000,000 to over 5,000,000 per season, and the output finds a market chiefly in Toronto. Statistics of production are available since 1897 and are shown in the next table; the average price per thousand has varied from \$8 to \$20.

The imports of paving brick have during the past three years exceeded the domestic production. During the calendar year 1911 the imports were 11,450 thousand, valued at \$164,292, or \$14.34 per thousand, and included 4,988 thousand, valued at \$78,201, or \$15.68 per thousand, from the United States, and 6,462 thousand, valued at \$86,091, or \$13.32 per thousand, from Great Britain. The imports during the calendar year 1910 were 10,503 thousand, valued at \$124,994.

#### Annual Production of Paving Brick.\*

Year.	M.	Value.	Average per M.	Year.	M.	Value.	Average per M.
		\$	\$ cts.			\$	\$ cts.
1897.....	4,568	45,670	10 00	1904.....	4,436	55,450	12 50
1898.....				1905.....	4,500	54,000	12 00
1899.....	5,309	42,550	8 03	1906.....	3,000	45,000	15 00
1900.....	2,710	26,950	9 94	1907.....	3,618	72,354	20 00
1901.....	3,689	37,000	10 03	1908.....	3,720	59,456	15 98
1902.....	4,211	42,000	9 97	1909.....	3,760	67,408	17 93
1903.....	3,789	45,288	11 95	1910.....	4,215	78,980	18 74
				1911.....	5,220	79,444	15 22

\* Figures previous to 1907 compiled from Ontario Bureau of Mines.



## Imports of Paving Brick.\*

Fiscal Year.	M.	Value.	Average per M.	Fiscal Year.	M.	Value.	Average per M.
		\$	\$ cts.			\$	\$ cts.
1895.....	275	5,006	18 20	1903.....	1,337	18,811	14 07
1896 .....	918	10,132	11 04	1904.....	1,986	29,753	14 98
1897 .....	52	719	13 83	1905.....	3,350	32,578	13 86
1898 .....	367	2,337	6 37	1906 .....	4,104	46,008	11 21
1899 .....	1,583	23,648	14 94	1907 (9 mos).....	2,182	23,256	10 66
1900.....	2,175	35,644	16 39	1908.....	5,340	61,346	11 49
1901.....	900	10,414	11 57	1909 .....		101,187	†
1902 .....	1,030	16,788	16 30	1910.....		138,763	
				1911.....	10,836	130,861	12 08

\* Duty 20 per cent.

† The imports during July, 1908, under the general tariff, are reported as 6,581 M., value \$7,317, an apparent error. There appears also to be an error in the entries for July, August, and September of the same year. Similar errors were apparently made in the figures for the fiscal year 1910 and the total number has, therefore, been omitted for these years. The actual value of the imported brick varies from \$10 to \$12 per M.

*Fireclay and Fireclay Products.*—There are a number of clays from different localities that have been used in the manufacture of refractory brick or firebrick, and for furnace linings, etc., which have been usually termed fireclays. These include clays found with the coal measures at Westville, Nova Scotia, and at Comox, Vancouver island; also clays found south of Moosejaw, Saskatchewan, and at Clayburn, near the city of Vancouver, British Columbia. Stove lining and other refractory clay products are made at several places in Ontario and Quebec from imported fireclays.

The total value of the sales of fireclay, firebrick, and fireclay products in 1911 was \$89,130, as compared with a valuation of \$50,215 in 1910, and \$78,132 in 1909.

The production in 1911 comprised 2,367,937 firebrick, valued at \$44,122, or an average of \$18.63 per thousand; fireclay or refractory clay sold was 7,532 tons, valued at \$24,128, and other fireclay products valued at \$20,880.

The imports of firebrick during the calendar year 1911 were valued at \$814,414, of which \$659,602 worth was imported from the United States, and \$154,020 from Great Britain. The imports of firebrick in 1910 were valued at \$811,927, and included \$734,908 from the United States and \$76,902 from Great Britain. Fireclay was imported during the calendar year 1911 to the value of \$125,199, as compared with a value of \$124,293 in 1910, and \$86,161 in 1909.

Statistics of the annual production since 1907 of firebrick, refractory clay or fireclay sold as such, and of fireclay products and statistics of the imports of firebrick and fireclay are shown in the following tables:—



### Production of Fireclay and Fireclay Products.

Year.	Firebrick.			Fireclay.			Other fireclay products.	Total value.
	No. sold.	Value.	Per M.	Tons.	Value.	Per Ton.	Value.	
		\$	\$ cts.		\$	\$ cts.	\$	\$
1907.....	4,323,179	113,322	26 21				18,000	131,322
1908.....	2,415,871	70,429	29 16	1,984	8,121	4 09	31,752	110,302
1909.....	1,059,270	32,742	30 92	4,405	12,390	2 81	33,000	78,132
1910.....	1,375,400	24,352	21 34	1,425	5,863	4 11	15,000	50,215
1911.....	2,367,937	44,122	18 63	7,532	24,128	3 20	20,880	89,130

### Imports of Firebrick and Fireclay, 1900-11.

Fiscal Year.	Fireclay.	Firebrick.	Fiscal Year.	Fireclay.	Firebrick.
	\$	\$		\$	\$
1900 .....	59,291	39,535	1906.....	131,130	51,892
1901 .....	79,530	32,831	1907*.....	85,044	349,185
1902.....	64,541	45,608	1908.....	155,873	639,347
1903.....	94,509	34,522	1909.....	77,146	350,457
1904 .....	52,716	38,335	1910.....	86,151	519,454
1905.....	73,837	44,746	1911.....	129,728	864,465

\* 9 months ending March.

*Sewerpipe and Drain Tile.*—The total value of the sales of sewerpipe in 1911 was \$812,716, as compared with a value of \$774,110 in 1910, and a value of \$645,722 in 1909. Nearly 50 per cent of the production in 1911 was made in Ontario.

Following is a list of firms reporting production of sewerpipe in 1911:—

Standard Drain Pipe Co., St. Johns, Que., and New Glasgow, N.S.  
 Ontario Sewer Pipe Company, Toronto, Ont.  
 Dominion Sewer Pipe Company, Toronto, Ont.  
 Hamilton and Toronto Sewer Pipe Co., Ltd., Hamilton, Ont.  
 Clayburn Company Ltd., Clayburn, B.C.  
 B.C. Pottery Company, Victoria, B.C.

The imports of drain pipe and sewerpipe during the calendar year 1911 were valued at \$382,929, of which \$338,644 worth was imported from the United States, \$44,278 from Great Britain, and \$7 from other countries.

The production of drain tile as reported to this Branch was not as large in 1911 as in 1910 or 1909. The total sales in 1911 were valued at \$339,812, as against \$370,008 in 1910, and \$408,440 in 1909.

The Ontario Bureau of Mines reports the total number made in that Province during 1911 as 21,461,000, valued at \$343,956, or an average of \$16.03 per thousand, as compared with 21,028,000, valued at \$318,456, or an average of \$15.14 per thousand, in 1910. The sales in Ontario in 1911 as reported to the Mines Branch were valued at \$300,029, as against a value of \$334,402 in 1910.

The imports of unglazed tile are comparatively small, the value during the calendar year 1911 being \$5,640 only, as compared with \$4,485 in 1910, and \$2,785 in 1909.

Statistics of the annual production of sewerpipe and of the imports of drain tile and sewerpipe are shown in the next three tables:—

### Production of Sewerpipe, etc.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1888 .....	266,320	1896 .....	153,875	1904 .....	440,894
1889 .....	Not available.	1897 .....	164,250	1905 .....	382,000
1890 .....	348,000	1898 .....	181,717	1906 .....	350,045
1891 .....	227,300	1899 .....	161,546	1907 .....	667,100
1892 .....	367,660	1900 .....	231,525	1908 .....	514,362
1893 .....	350,000	1901 .....	243,115	1909 .....	645,722
1894 .....	250,325	1902 .....	301,965	1910 .....	774,110
1895 .....	287,045	1903 .....	317,970	1911 .....	812,716

### Production of Drain Tile in Ontario.

(As ascertained by the Ontario Bureau of Mines).

Year.	No.	Value.	Year.	No.	Value.	Year.	No.	Value.
		\$			\$			\$
1891...	7,500,000	90,000	1898...	22,668,000	225,000	1905...	15,000,000	220,000
1892...	10,000,000	100,000	1899...	21,027,400	240,246	1906...	17,700,000	252,500
1893...	17,300,000	190,000	1900...	19,544,000	209,738	1907...	15,578,000	250,122
1894...	25,000,000	280,000	1901...	21,592,000	231,374	1908...	24,800,000	338,658
1895...	14,330,000	157,000	1902...	17,510,000	199,000	1909...	27,418,000	363,550
1896...	13,200,000	144,000	1903...	18,200,000	227,000	1910...	21,028,000	518,456
1897...	*	*	1904...	16,000,000	210,000	1911...	21,461,000	343,956

\* Not stated

## Imports of Drain Tile and Sewerpipe.

Fiscal Year.	Drain tile (a).	Sewerpipe (b).	Fiscal Year.	Drain tile (a).	Sewerpipe (b).
	\$	\$		\$	\$
1880.....		33,796	1896.....	339	18,957
1881.....		37,368	1897.....	416	33,870
1882.....		70,061	1898.....	157	29,454
1883.....		70,699	1899.....	1,817	32,071
1884.....	5,585	66,170	1900.....	1,383	37,766
1885.....	2,911	66,678	1901.....	1,264	54,819
1886.....	1,905	56,048	1902.....	269	55,261
1887.....	2,183	69,020	1903.....	252	57,100
1888.....	4,290	96,967	1904.....	1,637	53,958
1889.....	2,346	80,869	1905.....	1,229	101,166
1890.....	3,780	73,654	1906.....	4,727	131,353
1891.....	673	86,522	1907 (9 mos.)....	12,106	93,458
1892.....	473	59,064	1908.....	2,080	125,747
1893.....	110	38,891	1909.....	2,394	106,399
1894.....	53	24,572	1910.....	2,739	196,002
1895.....	695	20,358	1911.....	4,373	174,653

(a) Drain tile, not glazed.

(b) Drain pipes, sewerpipes, and earthenware fittings therefor, chimney linings, or vents, chimney tops and inverted blocks, glazed or unglazed.

*Pottery and Earthenware.*—The pottery made from Canadian clays has been, hitherto, chiefly of the common grades, such as flowerpots, jardinières, crocks, jars, churns, etc. A number of potters make a higher grade product of stoneware, but the majority of these use imported clays. Sanitaryware is made at St. Johns, Que., and other points; but the raw material, including clays and feldspar, is nearly all imported.

The total value of the production of pottery and clay sanitaryware in 1911, according to returns received, was \$439,264, of which it is estimated that a value of \$336,771 is attributable to imported clays. The value of the production reported in 1910 was \$250,924, and in 1909, \$285,285. Annual statistics of production are shown herewith.

## Annual Production of Pottery.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1888.....	27,750	1896.....	163,427	1904.....	140,000
1889.....	Not available.	1897.....	129,629	1905.....	120,000
1890.....	195,242	1898.....	214,675	1906.....	150,000
1891.....	258,844	1899.....	185,000	1907.....	253,809
1892.....	265,811	1900.....	200,000	1908.....	200,541
1893.....	213,186	1901.....	200,000	1909.....	285,285
1894.....	162,144	1902.....	200,000	1910.....	250,924
1895.....	151,588	1903.....	200,000	1911.....	102,493

Details of the imports of earthenware and chinaware, showing the values imported and the countries of origin, have already been given in the general table of imports, pages 21 and 22.

The total imports in 1911 were valued at \$2,516,536, as compared with a value of \$2,283,116 in 1910. These imports are subdivided into eight classes and in 1911 include: brown or coloured earthenware, etc., \$52,100; C.C. or cream coloured ware, decorated, printed, or sponged, etc., \$184,291; demijohns, churns, or crocks, \$4,933; tableware of china, porcelain, white granite, etc., \$1,718,582; china and porcelain ware, N.O.P., \$62,025; tiles or blocks of earthenware or stone prepared for mosaic flooring, \$123,203; earthenware tiles, N.O.P., \$154,351; manufactures of earthenware, N.O.P., \$217,051.

Great Britain is the principal source of the imports of this class of products, but quite large supplies are also obtained from the United States, Germany, France, Austria-Hungary, Japan, Belgium, and other countries.

### Imports of Earthenware and Chinaware.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	322,333	1891.....	634,907	1902.....	1,275,093
1881.....	439,029	1892.....	748,810	1903.....	1,406,610
1882.....	646,734	1893.....	709,737	1904.....	1,611,356
1883.....	657,886	1894.....	695,514	1905.....	1,636,214
1884.....	544,586	1895.....	547,935	1906.....	1,692,359
1885.....	511,853	1896.....	575,493	1907 (9 mos.).....	1,422,880
1886.....	599,269	1897.....	595,822	1908.....	2,190,784
1887.....	750,691	1898.....	675,874	1909.....	1,716,887
1888.....	697,082	1899.....	916,727	1910.....	1,859,302
1889.....	697,949	1900.....	959,526	1911.....	2,398,416
1890.....	695,206	1901.....	1,114,677		

*Kaolin.*—Although there has as yet been no actual commercial production of china-clay or kaolin in Canada, the development of kaolin deposits in the township of Amherst, Ottawa county, and the construction of a washing or refining plant at St. Remi d'Amherst, are worthy of note.

The present operators are the Canadian China Clay Co., incorporated at Ottawa, February 3, 1912, with a capital of \$250,000; head office, 151 St. James street, Montreal. The property is located on parts of lots 4, 5, 6, 7, and 8 of range VI south, township of Amherst, county of Ottawa, Quebec.

Mr. John C. Broderick, St. Remi d'Amherst, is mine manager, and Mr. Jas. G. Ross, B.Sc., consulting engineer.

The plant<sup>1</sup> for refining the clay is situated 2 miles from St. Remi d'Amherst and 7 miles from Huberdeau station, the terminus of the Canadian Northern Quebec railway, 94 miles northwest of Montreal.

Development work was begun by the present operators in June, 1911, and the washing plant completed in April of 1912.

<sup>1</sup>A short description of the plant and property was published in the Canadian Mining Journal, July 1, 1912.



The clay is mined by digging, no drilling or blasting being necessary, trammed 600 feet to the plant, washed free from grit and allowed to settle. After the filter presses have extracted the surplus moisture, it is dried in the open air in stacks. Dry kilns are being built for drying in the winter and wet seasons. After drying it will be pulverized and bagged for shipment. It is expected that an immediate market will be found in the demand of the Canadian paper mills.

The imports of china-clay, ground and unground, into Canada during the twelve months ending December 31, 1911, were valued at \$125,768, as against a value of \$142,125 in 1910, and \$100,066 in 1909, thus indicating to some extent at least the present actual demand for this product. The imports of earthenware and chinaware, however, valued at \$2,516,536 in 1911, and composed chiefly of tableware of china, porcelain, etc., show the possibilities in the development of industries utilizing china-clays.

Kaolin or china-clay is also in considerable demand in the United States, the imports into that country in 1910 being valued at \$1,593,472.

The kaolin deposits of Amherst were first brought to the attention of the Department in 1894, when samples were submitted to the Geological Survey Museum by Mr. R. Lanigan, of Calumet, Que. In 1896, samples were sent to porcelain works at Trenton, N.J., and were very favourably reported upon, but no serious attempt to develop the property was made until the past season.



## LIME.

The production of lime in Canada in 1911, according to returns received from the producers, was 7,533,525 bushels, this being the amount sold or used (equivalent to about 263,673 tons), and valued at \$1,517,599, or an average of 20 cents per bushel, or \$5.75 per ton.

The production in 1910 was reported as 5,848,146 bushels (204,685 tons), valued at \$1,137,079, an average of 19 cents per bushel, thus showing an increased production in 1911 of 1,685,579 bushels, or 22 per cent.

Returns were received from seventy-five active firms in 1911, as compared with seventy firms in 1910. The average number of men employed was 1,056, and wages paid, \$523,518, during the past year, as against 976 men employed and \$466,876 paid in wages in 1910. Statistics of labour and wages should be used with discrimination, however, as many firms producing lime are also engaged in quarrying stone for purposes other than lime making, and are unable to make separate reports as to labour employed. This is particularly evident in the record for Nova Scotia and New Brunswick, since for the first mentioned the record includes only the labour employed at the kilns, while for the latter the quarry costs are also included.

The average price per bushel varied from a minimum of 16 cents in Ontario to a maximum of 34 cents in British Columbia.

Hydrated lime was produced by three firms only, the sales being 5,023 tons.

A small quantity of lime is annually made in Prince Edward Island. The production is separately shown for 1911, but for previous years is included in the Nova Scotia figures.

### Lime Production by Provinces, 1911.

Province.	No. of active firms reporting.	Men employed.	Wages paid.	SALES.			
				Bushels.	Value.	Average per bushel.	Per cent of total.
			\$		\$	cts.	%
P. E. Island*.....	3	8	852	20,250	6,765	33	0.44
Nova Scotia.....	1	10	3,964	618,950	123,790	20	8.16
New Brunswick....	5	100	41,378	613,728	132,897	22	8.76
Quebec.....	22	307	139,466	1,428,392	356,453	25	23.49
Ontario.....	31	423	205,618	3,360,265	538,102	16	35.51
Manitoba.....	5	89	44,379	706,888	140,629	20	9.27
Alberta.....	4	33	33,960	434,038	100,407	23	6.61
British Columbia....	4	86	53,901	351,014	117,756	34	7.76
Total.....	75	1,056	523,518	7,533,525	1,517,599	20	100.00

\* Production in previous years included in Nova Scotia figures.

## Lime Production by Provinces, 1910.

Province.	No. of active firms reporting.	Men employed.	Wages paid.	SALES.			
				Bushels.	Value.	Average per bushel.	Per cent of total.
			\$		\$	cts.	%
Nova Scotia.....	4	45	10,504	55,750	13,490	24	1.2
New Brunswick....	6	109	42,524	470,050	105,593	22	9.3
Quebec.....	17	223	107,275	1,227,555	299,126	23	26.3
Ontario.....	31	410	180,557	2,988,020	476,137	16	41.9
Manitoba.....	5	95	48,707	606,679	100,808	17	8.8
Alberta.....	3	29	21,700	303,214	69,268	23	6.1
British Columbia....	4	65	55,608	196,878	72,657	37	6.4
Total.....	70	976	466,876	5,848,146	1,137,079	19	100.0

## Lime Production by Provinces, 1908 and 1909.

Province.	1908.				1909.			
	Bushels.	Value.	Average per bushel.	Per cent.	Bushels.	Value.	Average per bushel.	Per cent.
		\$	cts.	%		\$	cts.	%
Nova Scotia.....	51,068	16,102	32	2.3	57,730	16,729	29	1.5
New Brunswick..	155,748	34,262	22	4.8	697,466	154,151	22	13.6
Quebec.....	857,700	201,357	23	28.2	1,281,827	315,633	25	27.9
Ontario.....	2,087,731	358,507	17	50.3	2,619,553	434,147	17	38.3
Manitoba.....	138,786	24,192	17	3.4	423,954	69,670	16	6.2
Alberta.....	135,000	34,500	26	4.8	231,125	67,350	24	5.9
British Columbia.	176,435	44,027	25	6.2	231,269	75,076	32	6.6
	3,601,468	712,947	20	100.0	5,592,924	1,132,756	20	100.0

*Exports and Imports.*—The value of the lime exported during the calendar year 1911 was \$39,536, the destination of shipments being mainly the United States. The quantity is not reported, but at the average price of lime in Canada (20 cents a bushel) the quantity would be about 692 tons.

The imports of lime during the same period were 228,538 barrels (22,853 tons), valued at \$161,985: an average of 70 cents per barrel, or \$7.08 per ton, and were derived chiefly from the United States.

Annual statistics of exports and imports are given in the next two tables:—

## Exports of Lime.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1891.....	119,853	1898.....	49,594	1905.....	85,723
1892.....	121,535	1899.....	73,565	1906.....	57,072
1893.....	86,623	1900.....	80,852	1907.....	55,903
1894.....	83,670	1901.....	99,194	1908.....	43,316
1895.....	71,657	1902.....	116,009	1909.....	48,821
1896.....	70,820	1903.....	131,412	1910.....	44,762
1897.....	53,177	1904.....	73,838	1911.....	39,536

## Imports of Lime.

Fiscal Year.	Barrels.	Value.	Fiscal Year.	Barrels.	Value.
		\$			\$
1880.....	6,100	6,013	1896.....	10,239	7,331
1881.....	5,796	4,177	1897.....	16,108	10,529
1882.....	5,064	5,365	1898.....	12,850	9,002
1883.....	7,623	9,224	1899.....	15,720	11,124
1884.....	10,804	11,200	1900.....	12,865	11,211
1885.....	12,072	11,503	1901.....	19,657	14,534
1886.....	11,021	9,347	1902.....	24,602	17,584
1887.....	10,835	8,524	1903.....	31,108	22,470
1888.....	10,142	7,537	1904.....	54,359	39,639
1889.....	13,079	9,363	1905.....	98,676	71,588
1890.....	8,149	5,360	1906.....	134,334	93,630
1891.....	6,259	4,273	1907 (9 mos.)	88,919	67,573
1892.....	6,132	4,241	1908.....	129,379	99,611
1893.....	6,879	4,917	1909.....	153,934	106,263
1894.....	6,766	4,907	1910.....	191,537	116,964
1895.....	12,008	5,743	1911 Duty 20 per cent....	194,809	143,338

In reviewing the production of lime by provinces it will be observed that the Provinces of Ontario and Quebec, being the chief centres of population, are the largest producers, the former contributing in 1911 over 35 per cent of the total quantity, and the latter 23 per cent; the production west of the great lakes has, however, been rapidly increasing, these provinces accounting for nearly 24 per cent of the total in 1911, as against 14 per cent in 1908.

Statistics of the annual production of lime in Ontario as published by the Ontario Bureau of Mines are available since 1896, and are shown in the next table. For the years previous to 1910, these returns are slightly higher than those obtained by the Mines Branch.

# Annual Production of Lime in Ontario.

(As ascertained by the Ontario Bureau of Mines.)

Calendar Year.	Bushels.	Value.	Cents per bushel.	Calendar Year.	Bushels.	Value.	Cents per bushel.
		\$				\$	
1896.....	1,800,000	222,000	12	1904.....	2,600,000	406,800	16
1897.....	2,620,000	308,000	12	1905.....	3,100,000	424,700	14
1898.....	2,620,000	308,000	12	1906.....	2,885,000	496,785	17
1899.....	4,342,500	535,000	12	1907.....	2,650,000	418,700	17
1900.....	3,895,000	544,000	14	1908.....	2,442,331	448,596	18
1901.....	4,100,000	550,000	13	1909.....	2,633,500	470,858	18
1902.....	4,300,000	617,000	14	1910.....	2,889,235	474,531	16
1903.....	3,400,000	520,000	15	*1911.....	2,335,085	394,551	17

\* Provisional.

## SAND-LIME BRICK.

The manufacture of sand-lime or silica brick, although of comparatively recent origin in Canada, has developed with considerable rapidity during the past five years, for which statistics have been collected.

Returns received from sixteen producing firms showed total sales in 1911 of 51,535,243 brick, valued at \$442,427, or an average of \$8.58 per thousand, as compared with a production of 44,593,541 brick, valued at \$371,857, or an average of \$8.34 per thousand, by thirteen firms in 1910.

The total sales by nine firms in 1909 were 27,052,864 brick, valued at \$201,650, or an average of \$7.45 per thousand.

The number of men employed in 1911 was 337, and wages paid, \$166,902.

The number of completed plants at the end of 1911 was seventeen, of which eight were in Ontario, four in Manitoba, two in Saskatchewan, one in Alberta, and two in British Columbia. Two additional plants were under construction.

Annual statistics of production since 1907 are shown below:—

**Annual Production of Sand-Lime Brick.**

Calendar Year.	Number sold.	Value.	Per M.
		\$	\$ cts.
1907.....	16,492,971	167,795	10 17
1908.....	17,288,260	152,856	8 84
1909.....	27,052,864	201,650	7 45
1910.....	44,593,541	371,857	8 34
1911.....	51,535,243	442,427	8 58

The following is a list of manufacturers of sand-lime brick reporting to the Department:—

Completed plants—

- The Schultz Bros. Co., Ltd., Brantford, Ont.
- The Jno. Mann Brick Co., Ltd., Brantford, Ont.
- The Silicate Brick Co. of Ottawa, Ltd., Ottawa, Ont.
- The Peterboro Sandstone Brick Co., Ltd., Peterborough, Ont.
- Toronto Brick Co., Ltd., 64 Wellington St. W., Toronto, Ont.
- Canada Sand Lime Pressed Brick Co., 1661 Dundas St., Toronto, Ont.
- Harbour Brick Co., Ltd., 50 Front St. E., Toronto, Ont.
- The Port Arthur Sand Lime Brick Co., Port Arthur, Ont.
- The Brandon Sandstone Co., Ltd., Brandon, Man.
- Manitoba Pressed Brick Co., Ltd., 215 McIntyre Block, Winnipeg, Man.
- Winnipeg Sandstone Brick Co., 410 Builders' Exchange, Winnipeg, Man.



The Alsip Sandstone Brick Co., Ltd., 502 Builders' Exchange, Winnipeg, Man.

Moosejaw Pressed Brick Co., Moosejaw, Sask.

Interocean Pressed Brick Co., Regina, Sask.

Calgary Silicate Pressed Brick Co., Calgary, Alta.

Vancouver Pressed Brick and Stone Co., Ltd., 145 Front St. W., Vancouver, B.C.

Victoria-Vancouver Lime and Brick Co., Victoria, B.C.

Plants under construction—

The Wilcox Lake Brick Co., 6 Marlboro Ave., Toronto, Ont.

The British Columbia Pressed Brick Co., Vancouver, B.C.

## SAND AND GRAVEL.

No attempt has yet been made by this Department to obtain complete statistics of the production of building sand or gravel, but the record of exports and imports as collected by the Department of Customs has been published from year to year and is shown in tables below.

The business of obtaining and supplying sand and gravel is, however, becoming well organized in many districts. In the Province of Quebec, coarse river sand is being taken from the beds of certain streams under mining license from the Quebec Government, the sand being shipped to Montreal and other large centres, where it finds a ready market for building purposes. The Superintendent of Mines of Quebec reports a production from such sources in 1911 valued at \$62,000. This will, of course, be only a small fraction of the value of such material produced in that Province during the year.

The Provincial Mineralogist for British Columbia states that near Vancouver and Victoria, companies have been formed for supplying washed sand and gravel properly screened to size, some of these companies having installed a system of mining the gravel by hydraulic streams and carrying the product to the screens by the water used. The value of the sand and gravel produced for use in these two cities amounted during the past year to over \$360,000.

### Annual Exports of Sand and Gravel.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1893.....	329,116	121,795	1903.....	355,792	124,006
1894.....	324,656	86,940	1904.....	399,809	129,803
1895.....	277,162	118,359	1905.....	306,935	152,805
1896.....	224,769	80,110	1906.....	336,550	139,712
1897.....	152,963	76,729	1907.....	298,095	119,853
1898.....	165,954	90,498	1908.....	298,954	161,387
1899.....	242,450	101,640	1909.....	481,584	256,166
1900.....	197,558	101,666	1910.....	624,824	407,974
1901.....	197,302	117,465	1911.....	573,494	408,110
1902.....	159,793	119,120			

### Annual Imports of Sand and Gravel.

Fiscal Year.	Tons.	Value.	Fiscal Year.	Tons.	Value.
		\$			\$
1893.....	26,065	31,739	1903.....	91,518	95,647
1894.....	41,573	33,506	1904.....	110,654	107,547
1895.....	19,609	24,779	1905.....	85,339	92,722
1896.....	18,953	24,604	1906.....	116,500	173,727
1897.....	21,308	25,222	1907 (9 mos.).....	171,700	177,412
1898.....	32,148	43,287	1908.....	266,704	223,043
1899.....	30,288	42,209	1909.....	132,158	136,011
1900.....	35,713	41,280	1910.....	151,982	155,012
1901.....	35,749	42,891	1911.....	241,375	246,613
1902.....	47,381	58,668			

## SLATE.

The production of slate in 1911 is reported as 1,833 squares, valued at \$8,248, which is a little less than one-half the production of 1910, which was 3,959 squares, valued at \$18,492.

The output was as usual obtained from the New Rockland quarries, in Melbourne township, Richmond county, Quebec, operated under lease by Messrs. Frazer and Davies. The same firm also opened up a quarry during the year at Botsford, Temiscouata county.

In the Province of Ontario some development work was undertaken on a slate property near New Liskeard, in Hudson township, lot 10, concession V, this property being owned by the Canada Slate Co., Ltd., of New Liskeard. No shipments were made.

Statistics of annual production are shown herewith:—

### Annual Production of Slate.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	5,345	64,675	1899.....		33,406
1887.....	7,357	89,000	1900.....		12,100
1888.....	5,314	90,689	1901.....		9,980
1889.....	6,935	119,160	1902.....		19,200
1890.....	6,368	100,250	1903.....	5,510	22,040
1891.....	5,000	65,000	1904.....	5,277	23,247
1892.....	5,180	69,070	1905.....		21,568
1893.....	7,112	90,825	1906.....		24,446
1894.....		75,550	1907.....	4,335	20,056
1895.....		58,900	1908.....	2,950	13,496
1896.....		53,370	1909.....	4,000	19,000
1897.....		42,800	1910.....	3,959	18,492
1898.....		40,791	1911.....	1,833	8,248

No exports of slate have been reported since 1909.

The imports of slate have ranged in value during the past six years from \$100,000 to \$170,000 per annum. The total value of the imports during the calendar year 1911 was \$169,685, comprising: roofing slate, \$83,075; school writing slate, \$35,049; slate pencils, \$6,036; other slates and manufactures of slate, \$45,525. The total value of the imports during the calendar year 1910 was \$142,285. The imports of roofing slate, school writing slate, and manufactures of slate N.O.P. are chiefly from the United States. Some roofing slate is also imported from Great Britain, while slate pencils come chiefly from Germany and the United States.

Statistics of imports and exports are shown in the following tables:—

## Imports of Slate during the Years 1909, 1910, and 1911.

Slate and manufactures of.	Calendar Year 1909.	Calendar Year 1910.	Calendar Year 1911.
	\$	\$	\$
Roofing slate.....	71,914	67,063	83,075
School writing slate.....	34,085	31,397	35,049
Slate pencils .....	6,154	6,948	6,036
Slate of all kinds and manufactures of.....	23,068	36,877	45,525
	135,221	142,285	169,685

## Exports of Slate.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1884.....	539	6,845	1893.....	178	3,168
1885.....	346	5,274	1894.....	187	3,610
1886.....	34	495	1895.....	36	574
1887.....	27	373	1896.....	301	8,913
1888.....	22	475	1897 to 1907.....	Nil.	Nil.
1889.....	26	3,303	1908.....		2,539
1890.....	12	153	1909.....	134	612
1891.....	15	195	1910.....	Nil.	Nil.
1892.....	87	2,038	1911.....	Nil.	Nil.

## Imports of Slate.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	21,431	1891.....	46,104	1902.....	72,601
1881.....	22,184	1892.....	50,441	1903.....	84,437
1882.....	24,543	1893.....	51,179	1904.....	86,057
1883.....	24,968	1894.....	29,267	1905.....	93,228
1884.....	23,816	1895.....	19,471	1906.....	112,941
1885.....	28,169	1896.....	24,176	1907 (9 mos.).....	95,520
1886.....	27,852	1897.....	21,615	1908.....	131,069
1887.....	27,845	1898.....	24,907	1909.....	124,065
1888.....	23,151	1899.....	33,100	1910.....	136,401
1889.....	41,370	1900.....	53,707	1911.....	147,172
1890.....	22,871	1901.....	72,187		

## STONE.

Statistics of stone production given herewith include the sales of all classes of stone used for building, monumental, and ornamental purposes, stone for paving purposes, curbstone, and flagstone, rubble, rip-rap, and crushed stone, limestone for furnace flux, sugar factories, etc., but stone used for burning lime or the manufacture of cement is not included.

The kinds of stone quarried have been classed as granite, limestone, sandstone, and marble.

The records are practically confined to quarry operations or the production of sawn or polished stone when these operations are carried on by the quarry operators. In addition to this production of stone by regular operators, there is no doubt a large stone production by individuals, such as farmers and others, for house or barn foundations, concrete work, etc., of which it would be impracticable to obtain any satisfactory record. Much stone is probably also used in railway construction work and in road building, of which no record has yet been obtained.

It is impossible, except in a few cases, to show the quantity of stone production, so that the value only of the shipment can be given.

The total value of the production of stone in 1911, according to returns received, was \$4,328,757, as compared with a value of \$3,650,019 in 1910, showing an increased production of \$678,738, or 18.6 per cent.

The number of active firms reporting in 1911 was 191, the total number of men employed 5,437, and the total wages paid, \$2,500,005. In 1910 the number of active firms reporting was 166, the number of men employed 5,105, and wages paid, \$2,225,791.

Of the total value of the 1911 production, limestone contributed \$2,594,926, or nearly 60 per cent; granite, \$1,119,865, or nearly 26 per cent; sandstone, \$451,183, or 10.4 per cent; and marble, \$162,783, or 3.8 per cent.

Stone was used for building purposes to the value of \$1,368,693, or 31.6 per cent of the total; monumental and ornamental stone, a value of \$303,050, or 7 per cent; curb, paving, and flagstone, \$233,723, or 5.4 per cent; rubble, \$460,803, or 10.6 per cent; crushed stone, \$1,509,498, or 34.9 per cent; and furnace flux, 874,224 tons, valued at \$452,990, or 10.5 per cent.

By provinces, Quebec again shows the largest output, having a value of \$1,894,892, or 43.8 per cent of the total, being made up of limestone to the value of \$1,296,577, granite valued at \$462,678, marble, \$135,187, and sandstone, \$450. Ontario takes second place with a production of \$892,305, or 20.6 per cent of the total, of which limestone is credited with \$680,461; granite, \$131,816; sandstone, \$54,032, and marble, \$25,996. British Columbia ranked third in order of importance, with a total of \$698,811, including granite, \$460,851;



sandstone, \$179,580; limestone, \$56,780, and marble, \$1,600. The production in Manitoba was valued at \$318,050, made up of limestone, \$315,782, and granite, \$2,268. The Nova Scotia production was valued at \$292,914, comprising limestone, \$245,216; granite, \$24,258, and sandstone, \$23,440. The Alberta production was reported as \$158,344, all sandstone. New Brunswick is credited with \$73,441, made up chiefly of sandstone and granite.

### Production of Stone by Provinces, 1911.

Province.	Granite.	Lime- stone.	Marble.	Sand- stone.	Total.	%
	\$	\$	\$	\$	\$	
Nova Scotia.....	24,258	245,216		23,440	292,914	6·8
New Brunswick.....	37,994	110		35,337	73,441	1·7
Quebec.....	462,678	1,296,577	135,187	450	1,894,892	43·8
Ontario.....	131,816	680,461	23,996	54,032	892,305	20·6
Manitoba.....	2,268	315,782			318,050	7·3
Alberta.....				158,344	158,344	3·7
British Columbia.....	460,851	56,780	1,600	179,580	698,811	16·1
Total.....	1,119,865	2,594,926	162,783	451,183	4,328,757	
Per cent.....	25·9	59·9	3·8	10·4		100·0

### Production of Stone by Provinces, 1910.

Province.	Granite.	Lime- stone.	Marble.	Sand- stone.	Total.	%
	\$	\$	\$	\$	\$	
Nova Scotia.....	18,291	192,919		16,425	227,635	6·2
New Brunswick.....	6,880	315		51,793	58,988	1·6
Quebec.....	356,257	962,429	151,000		1,469,686	40·3
Ontario.....	109,678	722,763	4,100	62,247	898,788	24·6
Manitoba.....	3,643	328,029			331,672	9·1
Alberta.....				240,858	240,858	6·6
British Columbia.....	244,767	43,121	3,679	130,825	422,392	11·6
Total.....	739,516	2,249,576	158,779	502,148	3,650,019	
Per cent.....	20·3	61·7	4·3	13·7		100·0

### Value of Stone Sold for Various Purposes in 1911.

Kind.	Building.	Ornamental and monu- mental.	Paving and curb- stone.	Rubble.	Crushed.	Furnace flux.	Total.
	\$	\$	\$	\$	\$	\$	\$
Granite.....	324,011	129,017	172,246	51,962	442,639		1,119,865
Limestone.....	625,402	38,746	36,902	374,327	1,066,559	452,990	2,594,926
Marble.....	27,596	135,187					162,783
Sandstone.....	391,684	100	24,575	34,524	300		451,183
Total.....	1,368,693	353,050	233,723	460,803	1,509,498	452,990	4,328,757

## Value of Stone Sold for Various Purposes in 1910.

Kind.	Building.	Ornamental and monumental.	Paving and curb-stone.	Rubble.	Crushed.	Furnace flux.	Total.
	\$	\$	\$	\$	\$	\$	\$
Granite .....	268,197	74,576	79,501	46,639	270,603	.....	739,516
Limestone .....	623,149	72,580	125,637	295,168	701,556	431,486	2,249,576
Marble .....	158,700	.....	.....	15	.....	64	158,779
Sandstone .....	453,955	265	34,530	10,178	3,220	.....	502,148
Total .....	1,504,001	147,421	239,668	352,000	975,379	431,550	3,650,019

## Production of Stone by Provinces and for Purposes used, 1911.

Province.	Building.	Ornamental and monumental.	Paving and curb-stone.	Rubble.	Crushed.	Furnace flux.	Total.
	\$	\$	\$	\$	\$	\$	\$
Nova Scotia .....	26,710	17,148	1,400	3,717	2,422	241,517	292,914
New Brunswick .....	45,348	22,986	.....	5,077	.....	30	73,441
Quebec .....	599,758	242,269	151,242	200,243	700,787	593	1,894,892
Ontario .....	168,012	8,647	54,091	98,615	408,870	154,070	892,305
Manitoba .....	74,424	.....	.....	106,782	136,844	.....	318,050
Alberta .....	151,787	.....	.....	6,557	.....	.....	158,344
British Columbia .....	302,654	12,000	26,990	39,812	260,575	56,780	698,811
Total .....	1,368,693	303,050	233,723	460,803	1,509,498	452,990	4,328,757
Per cent .....	31.6	7.0	5.4	10.6	34.9	10.5	100.0

## Production of Stone by Provinces and for Purposes used, 1910.

Province.	Building.	Ornamental and monumental.	Paving and curb-stone.	Rubble.	Crushed.	Furnace flux.	Total.
	\$	\$	\$	\$	\$	\$	\$
Nova Scotia .....	18,610	11,156	4,600	.....	350	192,919	227,635
New Brunswick .....	49,047	6,880	.....	2,761	200	100	58,988
Quebec .....	707,890	116,456	165,730	143,930	329,627	6,053	1,469,686
Ontario .....	83,602	9,929	65,588	135,550	414,826	189,293	898,788
Manitoba .....	215,378	.....	.....	53,302	62,992	.....	331,672
Alberta .....	234,487	.....	.....	6,371	.....	.....	240,858
British Columbia .....	194,987	3,000	3,750	10,086	167,384	43,185	422,392
Total .....	1,504,001	147,421	239,668	352,000	975,379	431,550	3,650,019
Per cent .....	41.2	4.0	6.6	9.7	26.7	11.8	100.0

*Exports and Imports.*—The exports of stone from Canada in 1911 were valued at \$28,335, as against \$27,571 in 1910 and \$57,685 in 1909. The principal item in the 1911 export was building stone, unwrought, of which the exports were 83,767 tons, valued at \$25,103. The exports of dressed stone in 1911, including both ornamental and building stone, were valued at \$1,436 only.

The exports of several classes of stone during the past three years, as shown by the Customs record, was as follows:—

**Exports of Stone during the Calendar Years 1909, 1910, 1911.**

	1909.		1910.		1911.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
Stone—						
Ornamental, granite, marble, etc., unwrought.....	1,027	8,606	446	3,352	168	1,796
Building, freestone, limestone, etc., unwrought.....	26,672	15,481	63,467	18,867	83,767	25,103
Ornamental, granite, marble, etc., dressed.....		33,097		5,272		980
Building, freestone, limestone, etc., dressed.....		501		80		456
		57,685		27,571		28,335

The annual exports since 1890 are shown in the following table:—

**Exports of Stone and Marble, Wrought and Unwrought.**

Calendar Year.	Wrought.	Unwrought.	Calendar Year.	Wrought.	Unwrought.
	\$	\$		\$	\$
1890.....	21,725	43,611	1901.....	5,917	157,739
1891.....	13,398	46,162	1902.....	8,632	124,829
1892.....	7,698	47,424	1903.....	7,684	46,295
1893.....	9,102	12,532	1904.....	4,760	17,802
1894.....	22,576	34,130	1905.....	3,545	13,089
1895.....	8,587	51,616	1906.....	23,097	4,675
1896.....	4,934	32,897	1907.....	4,233	3,087
1897.....	9,415	42,034	1908.....	15,194	36,820
1898.....	2,526	65,370	1909.....	32,598	24,087
1899.....	5,092	101,931	1910.....	5,352	22,219
1900.....	5,933	115,711	1911.....	1,436	26,899

The imports of stone are classified as building stone of all kinds, except marble, manufactures of granite and other stone, and marble and its manufactures. The total value of the imports during the calendar year 1911 was \$1,140,846, as compared with a value of \$845,123 in 1910; showing an increase of \$295,723, or about 35 per cent. Of the total imports in 1911, \$392,868 in value was classed as building stone, and included 21,356 tons of rough stone,

valued at about \$3.98 per ton, and 52,908 tons of dressed stone, valued at about \$5.82 per ton. The imports of sawn granite, manufactures of granite, and manufactures of stone N.O.P., were valued at \$207,836; paving blocks, \$64,676; marble and manufactures of, \$384,252. There was also an importation of refuse stone of 226,122 tons, valued at \$91,214.

During 1910 the imports of building stone were \$311,595; manufactured granite, \$192,213; paving blocks, \$74,100, and marble, \$267,215. The imports during both years were derived chiefly from the United States and Great Britain; the United States supplying building stone, paving blocks, and marble principally, and Great Britain mainly manufactures of granite. Marble is obtained in some quantity also from Italy and other countries. The total value of the imports from the United States in 1911 was \$946,624; from Great Britain, \$175,169; from Italy, \$6,334, and from other countries, \$12,719.

The value of the imports from the United States in 1910 was \$640,084; from Great Britain, \$160,664; from Italy, \$31,314, and from other countries, \$13,061.

### Total Imports of Stone during the Calendar Years 1910 and 1911.

Imports.	1910.		1911.	
	Tons.	Value.	Tons.	Value.
		\$		\$
Building stone, rough (1).....	27,658	125,531	21,356	85,084
" " dressed (2).....	33,996	186,064	52,908	307,784
Refuse stone (3).....	789	3,287	226,122	91,214
Granite, sawn only.....		154,798	539	4,231
" manufactures of.....		74,100		164,229
Paving blocks.....		34,128		64,676
Manufactures of stone, N.O.P.....				39,376
Marble and manufactures of:—				
Marble, sawn or sand rubbed, not polished.....		154,153		186,174
" rough, not hammered or chiselled.....		18,368		46,839
" manufactures of, N.O.P.....		94,694		151,229
.....		845,123		1,140,846

- (1) Flagstone, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.  
 (2) Flagstone and all other building stone, sawn or dressed.  
 (3) Stone refuse not sawn, hammered, or chiselled, not fit for flagstone, building stone, or paving.



## Imports of Stone, showing Country of Origin, Calendar Year 1911.

Imports.	Great Britain.		United States.		Italy.	Other countries.
	Tons.	Value.	Tons.	Value.	Value.	Value.
		\$		\$	\$	\$
Building stone, rough (1) .....	196	1,764	20,496	81,157		2,163
" " dressed (2) .....	109	419	52,659	306,694		671
Refuse " .....			226,122	91,214		
Granite, sawn only .....	118	911	421	3,320		
" manufactures of .....		156,101		8,128		
Paving blocks .....		43		64,633		
Manufactures of stone, N.O.P. ....		4,297		32,257		2,822
Marble and manufactures of :—						
Marble, sawn or sand rubbed, not polished .....		3,825		174,618	6,334	1,397
Marble, rough, not hammered or chiselled .....				45,589		1,250
Marble, manufactures of, N.O.P. ....		7,809		139,014		4,416
		175,169		946,624	6,334	12,719

- (1) Flagstone, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled  
 (2) Flagstone ; all other building stone, sawn or dressed.

## Imports of Stone, Fiscal Years 1910 and 1911.

Imports.	1910.		1911.	
	Tons.	Value.	Tons.	Value.
		\$		\$
Building stone, rough (1) .....	23,928	110,997	28,001	126,386
" " dressed (2) .....	36,884	184,620	36,578	206,224
Granite, sawn only .....	280	2,146	773	3,213
" manufactures of .....		130,697		159,377
Paving blocks .....		58,247		74,143
Manufactures of stone, N.O.P. ....		32,372		34,861
Marble and manufactures of :—				
Marble, sawn or sand rubbed, not polished .....		128,897		174,001
" rough, not hammered or chiselled .....		1,398		25,606
" manufactures of, N.O.P. ....		54,503		107,821
		703,877		911,632

- (1) Flagstone, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.  
 (2) Flagstone ; all other building stone, sawn or dressed.



## Annual Imports of Stone.

Fiscal Year.	BUILDING STONE.		Manufac- tures of granite, etc.	Marble.	Flagstone.	Total value.
	Rough.	Dressed.				
	\$	\$	\$	\$	\$	\$
1880..	32,824	3,146	29,408	63,015	.....	128,393
1881..	7,823	50,326	36,877	85,977	241	181,244
1882..	32,848	775	37,267	109,505	848	181,243
1883..	33,429	1,632	45,636	128,520	99	209,316
1884..	46,232	4,856	45,290	108,771	1,158	206,307
1885..	28,433	2,058	39,867	102,835	1,756	174,949
1886..	36,776	4,899	41,984	117,752	9,443	210,854
1887..	47,819	6,549	41,829	104,250	10,966	211,413
1888..	84,263	2,110	47,487	94,681	21,077	249,618
1889..	89,723	10,591	61,341	118,421	15,451	295,521
1890..	126,456	5,699	84,396	99,353	48,995	364,891
1891..	151,119	19,771	61,051	107,061	36,348	372,956
1892..	85,169	10,381	39,479	106,268	15,048	256,345
1893..	47,609	8,901	49,323	96,177	8,500	210,510
1894..	48,097	4,811	49,510	94,657	2,429	199,504
1895..	37,732	6,550	51,050	83,422	84	178,838
1896..	42,737	11,393	51,499	90,065	Nil	195,694
1897..	27,442	11,272	34,026	77,150	227	150,117
1898..	25,322	3,173	41,240	95,894	1,540	167,129
1899..	43,494	4,546	60,148	104,879	Nil	210,067
1900..	63,376	1,157	57,039	94,017	63	215,652
1901..	45,039	1,039	66,639	96,159	116	208,992
1902..	69,972	29,102	72,397	130,424	1,231	303,126
1903..	71,202	16,664	78,629	153,481	Nil	319,976
1904..	59,864	33,914	141,165	181,511	Nil	416,454
1905..	49,004	53,813	150,160	145,466	Nil	398,443
1906..	66,994	65,134	178,435	189,589	Nil	500,152
1907*	58,398	78,967	136,779	176,450	Nil	450,594
1908..	80,950	90,740	192,248	287,587	Nil	651,525
1909..	63,984	72,961	193,949	200,928	Nil	531,822
1910..	110,997	184,620	223,462	184,798	Nil	703,877
1911..	126,386	206,224	271,594	307,428	Nil	911,632

\* 9 months ending March 1907.

## GRANITE.

The production of granite and trap-rock in 1911, according to returns from forty-seven active firms reporting, was valued at \$1,119,865, as compared with a production by thirty-three firms, valued at \$739,516, in 1910; showing an increase of \$380,349, or 51.4 per cent. There was a particularly large increase in the value of granite used for building purposes and in the production of crushed stone.

Quebec province was again the largest producer, the value of sales in 1911 being \$462,678, as compared with \$356,257 in 1910. The value of sales in British Columbia in 1911, however, approached very closely to that of Quebec, being \$460,851, as against \$244,767 in 1910. Ontario produced granite to the value of \$131,816 in 1911, as compared with \$109,678 in 1910. Both New Brunswick and Nova Scotia showed an increased production, the value of the New Brunswick output being \$37,994. Much of the rough stone quarried in New Bruns-

wick, as well as stone imported from Redbeach, Maine, and Mt. Johnston, Que., is worked up into finished monumental and ornamental stone at mills at St. George, the value of the finished product here in 1911 being \$86,658.

Statistics of the production by provinces for 1911 and 1910, showing the purposes for which the stone was sold and the annual total production since 1886, are shown in the following tables:—

### Value of Granite Production by Provinces, 1911.

Province.	Building.	Monumental or ornamental.	Curb, or paving.	Rubble.	Crushed.	Total.
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	5,670	17,048	1,400	140	.....	24,258
New Brunswick.....	15,008	*22,986	.....	.....	.....	37,994
Quebec.....	168,759	74,687	116,256	.....	102,976	462,678
Ontario.....	13,100	2,296	27,600	12,000	76,820	131,816
Manitoba.....	.....	.....	.....	.....	2,268	2,268
British Columbia.....	121,474	12,000	26,990	39,812	260,575	460,851
Total.....	324,011	129,017	172,246	51,952	442,639	1,119,865

\* The value of the "Finished" stone in 1911 was \$86,658.

### Value of Granite Production by Provinces, 1910.

Province.	Building.	Monumental or ornamental.	Curb, or paving.	Rubble.	Crushed.	Total.
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	2,600	11,091	4,600	.....	.....	18,291
New Brunswick.....	.....	*6,880	.....	.....	.....	6,880
Quebec.....	202,435	53,405	40,831	3,055	56,531	356,257
Ontario.....	1,100	200	30,320	33,513	44,545	109,678
Manitoba.....	.....	.....	.....	.....	3,643	3,643
British Columbia.....	62,062	3,000	3,750	10,071	165,884	244,767
Total.....	268,197	74,576	79,501	46,639	270,603	739,516

\* "Finished" stone was valued at \$70,000.

### Annual Production of Granite.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	6,062	63,309	1899.....	13,418	90,542
1887.....	21,217	142,506	1900.....	.....	80,000
1888.....	21,352	147,305	1901.....	.....	155,000
1889.....	10,197	79,624	1902.....	.....	210,000
1890.....	13,307	65,985	1903.....	.....	200,000
1891.....	13,637	70,056	1904.....	.....	150,000
1892.....	24,302	89,326	1905.....	.....	226,305
1893.....	22,521	94,393	1906.....	.....	278,419
1894.....	16,392	109,936	1907.....	15,136	194,712
1895.....	19,238	84,838	1908.....	.....	282,320
1896.....	18,717	106,709	1909.....	.....	454,824
1897.....	19,345	61,934	1910.....	.....	739,516
1898.....	23,897	81,073	1911.....	.....	1,119,865

## LIMESTONE.

The statistics given herewith do not include the value of the stone burned into lime by the quarry operators nor that of the stone used in the manufacture of cement, a record of lime and cement production being separately given. With these exceptions, the total value of the production of limestone in Canada in 1911 was \$2,594,926, as compared with a value of \$2,249,576 in 1910, or an increase of about 15 per cent.

There was a decrease in the production of limestone for building and monumental purposes and for curbstone and paving, but an increased production of crushed stone and rubble. The production of furnace flux was slightly less in tonnage, but of increased value.

The production during 1911 of limestone for building purposes was valued at \$664,148, as against \$695,729 in 1910. The value of crushed stone in 1911 was \$1,066,559, as against \$701,556 in the previous year. Curbstone and paving blocks were produced to the value of \$36,902 in 1911, as compared with \$125,637 in 1910. The value of rubble in 1911 was \$374,327, as against \$295,168 in 1910. The production of furnace flux in 1911 was 874,224 tons, valued at \$452,990, as compared with 896,677 tons, valued at \$431,486, in 1910.

## Value of Limestone Production by Provinces, 1911.

Province.	Building and ornamental.	Crushed.	Curbstone and paving.	Rubble.	Furnace flux.		Total.
	\$	\$	\$	\$	Tons.	\$	\$
Nova Scotia.....		2,122		1,577	483,035	241,517	245,216
New Brunswick....	80				60	30	110
Quebec.....	462,944	597,811	34,986	200,243	659	593	1,296,577
Ontario.....	126,700	332,050	1,916	65,725	295,837	154,070	680,461
Manitoba.....	74,424	134,576		106,782			315,782
British Columbia....					94,633	56,780	56,780
Total.....	664,148	1,066,559	36,902	374,327	874,224	452,990	2,594,926

## Value of Limestone Production by Provinces, 1910.

Province.	Building and ornamental.	Crushed.	Curbstone and paving.	Rubble.	Furnace flux.		Total.
	\$	\$	\$	\$	Tons.	\$	\$
Nova Scotia.....					385,838	192,919	192,919
New Brunswick....	15	200			100	100	315
Quebec.....	417,506	273,096	124,899	140,875	9,573	6,053	962,429
Ontario.....	62,830	368,911	738	100,991	496,391	189,293	722,763
Manitoba.....	215,378	59,349		53,302			328,029
British Columbia....					94,772	43,121	43,121
Total.....	695,729	701,556	125,637	295,168	896,677	431,486	2,249,576

## Value of Limestone Production by Provinces, 1909.

Province.	Building and orna- mental.	Crushed.	Curbstone and paving.	Rubble.	Furnace flux.		Total.
	\$	\$	\$	\$	Tons.	\$	\$
Nova Scotia .....	2,025				319,795	159,897	161,922
New Brunswick .....	30						30
Quebec .....	456,338	257,185	154,259	94,221	20,500	10,250	972,253
Ontario .....	78,823	297,589	169	66,885	427,422	196,208	639,674
Manitoba .....	224,605	54,575	62	49,312			328,554
British Columbia .....					74,515	37,258	37,258
Total .....	761,821	609,349	154,490	210,418	842,232	403,613	2,139,691

## MARBLE.

From 1886 to 1896 there was a small production of marble, aggregating, however, only \$4,167 in value for the eleven years. During the next eleven years—1897 to 1907—there is no record of any production. But the opening up of the quarries at Philipsburg, Que., by the Missisquoi Marble Company, Limited, together with the development of quarries in Ontario and British Columbia, has resulted in a considerable production of marble during the past four years. The total value of the production in 1911 was returned as \$162,783, as compared with \$158,779 in 1910 and \$158,441 in 1909.

Marble quarries were operated during 1911 at Philipsburg and South Stukely, Que.; Dungannon and Hungerford townships in Ontario, and Marblehead, British Columbia.

The value of the Quebec production was \$135,187, as compared with \$151,000 in 1910 and \$130,000 in 1909. Ontario produced marble to the value of \$25,996, as against \$4,100 in 1910 and \$3,441 in 1909. British Columbia production was \$1,600, as compared with \$3,679 in 1910 and \$25,000 in 1909.

With the exception of the Philipsburg and Bancroft quarries, the operations were practically confined to the development of quarries.

## Annual Production of Marble.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886 .....	501	9,900	1894 .....	Nil	Nil
1887 .....	242	6,224	1895 .....	200	2,000
1888 .....	191	3,100	1896 .....	224	2,405
1889 .....	83	980	1897 to 1907 inclusive	Nil	Nil
1890 .....	780	10,776	1908 .....		125,000
1891 .....	240	1,752	1909 .....		158,441
1892 .....	340	3,600	1910 .....		158,779
1893 .....	590	5,100	1911 .....		162,783



The imports of marble during the calendar year 1911 were valued at \$384,252, as compared with \$267,215 in 1910 and \$182,147 in 1909.

The annual imports of marble since 1880 are shown in the general table of imports of stone, page 50.

### SANDSTONE.

The value of sandstone production in 1911 was reported as \$451,183, being a slight falling off as compared with the production in 1910, which was valued at \$502,148. The greater part of the sandstone quarried is used for building purposes, though small quantities are also used as rubble and for paving purposes.

Of the production in 1911, building and ornamental sandstone was sold to the value of \$391,784, or 86.8 per cent of the total sandstone sales. This amount comprised \$86,502 in rough stone and \$305,282 in dressed stone sold by the quarry operators. The production in 1910 of building and ornamental stone was valued at \$454,220, comprising \$118,364 in rough stone and \$335,856 in dressed stone.

Statistics of production in 1909, 1910, and 1911 are shown in the next three tables. There is no complete record of the sandstone production throughout Canada in previous years.

#### Value of Sandstone Production by Provinces, 1911.

Province.	Building and ornamental.	Crushed.	Paving.	Rubble.	Total.
	\$	\$	\$	\$	\$
Nova Scotia.....	21,140	300	.....	2,000	23,440
New Brunswick.....	30,260	.....	.....	5,077	35,337
Quebec .....	450	.....	.....	.....	450
Ontario.....	8,567	.....	24,575	20,890	54,032
Alberta.....	151,787	.....	.....	6,557	158,344
British Columbia.....	179,580	.....	.....	.....	179,580
Total.....	391,784	300	24,575	34,524	451,183

#### Value of Sandstone Production by Provinces, 1910.

Province.	Building and ornamental.	Crushed.	Paving.	Rubble.	Total.
	\$	\$	\$	\$	\$
Nova Scotia.....	16,075	350	.....	.....	16,425
New Brunswick.....	49,032	.....	.....	2,761	51,793
Ontario.....	25,301	1,370	34,530	1,046	62,247
Alberta.....	234,487	.....	.....	6,371	240,858
British Columbia.....	129,325	1,500	.....	.....	130,825
Total.....	454,220	3,220	34,530	10,178	502,148



## Value of Sandstone Production by Provinces, 1909.

Province.	Building and orna- mental.	Crushed.	Paving.	Rubble.	Total.
	\$	\$	\$	\$	\$
Nova Scotia.....	15,050	800	.....	6,000	21,850
New Brunswick.....	25,784	.....	.....	4,825	30,609
Ontario.....	29,584	2,563	17,774	12,903	62,824
Alberta.....	87,450	.....	.....	2,933	90,383
British Columbia.....	168,338	.....	.....	175	168,513
Total.....	326,206	3,363	17,774	6,836	374,179

























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